BULLETIN OF THE

TAYLOR SOCIETY

AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE
AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

Report on The Third International Management Congress

Standards

New Words for Old in Management Terminology

Engineering Societies Building
29 W. Thirty-Ninth St.
New York

OCTOBER, 1927 VOL. XII, NO. 5

DEC 21 1927

Objects of the Taylor Society Incorporated

The objects of this Society are, through research, discussion, publication and other appropriate means:

1. To secure—for the common benefit of the community, the worker, the manager and the employer—understanding and intelligent direction of the principles of administration and management which govern organized effort for accomplishing industrial and other social purposes.

2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.

3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaptation and application under varying and changing conditions.

4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, the worker, the manager and the employer.

5. To inspire in labor, manager and employer a constant adherence to the highest ethical conception of their individual and collective responsibility.

Membership

The membership of the Society comprises Members, Junior Members, Honorary Members, Life Members, Firm Members, Contributing Members and Student Associates. Application for membership should be made on a regular form which may be secured from the Society. New members may be elected directly to the grades marked*.

1. **Member*: An individual interested in the development of the science and the art of management as engineer, executive, operative, scientist, investigator or teacher. Minimum age 28. Initiation Fee, $15. Annual dues including subscription to the Bulletin, $20.

2. **Junior Member*: A younger member. A Junior Member may become a Member without payment of additional initiation fee at 28 years of age and must change to Member at 30 years. Initiation Fee, $5. Annual dues including subscription to the Bulletin, $10.

   For any of the above grades a person engaged in educational work, state service, government service or the service of ~~any~~ other non-commercial enterprise of an eleemosynary nature shall pay one-half the initiation fee and one-half the annual dues of the grade to which elected.

3. *Honorary Member*: A Fellow, over 50 years of age, who has rendered exceptionally distinguished service in the advancement of the science and the art of management.

4. **Life Member*: Any Fellow or Member who has prepaid all dues by the payment of $500.

5. **Firm Member*: A firm or organization interested in the advancement of the science and the art of management which desires to make the service of the Society available to members of its organization. A firm member designates two representatives (who may be changed from time to time at the organization's discretion) who have all the rights and privileges of membership except the right to vote and to hold office. Annual dues, including two subscriptions to the Bulletin, $40.

6. **Contributing Member*: Any individual, firm or organization desiring to promote the work of the Society by an annual contribution of $100 or more. A contributing member has all the privileges of personal or firm membership, as the case may be, including one subscription to the Bulletin for each $20 contributed.

7. **Student Associate*: A regularly enrolled student of management in any school of engineering, business administration, commerce or arts, of collegiate rank, or a graduate of such institution who has applied for membership not later than one year after graduation, elected upon recommendation of the instructor in charge of management courses. A Student Associate may become a Junior Member, without payment of initiation fee, any time after graduation and must become a Junior Member at the age of 25. Annual dues including subscription to the Bulletin, $3.

All dues are payable in advance, either annually or in semi-annual installments. The fiscal year is November 1 to October 31. Members elected other than at the beginning of the fiscal year are charged pro rata (quarterly) for the first year.

DEC 15 1927

©Cl B760440

BULLETIN OF THE

TAYLOR SOCIETY

AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

Published by the Taylor Society Incorporated, at
Engineering Societies Building
29 West Thirty-Ninth St., New York
Cable address: Taysoc

Copyrighted 1927, by the Taylor Society Incorporated.

Published every other month. Per year to Members $2.50; to others $3.00. This Issue $.50.
Entered as second-class matter, Dec. 17, 1921, at the Post Office at New York N. Y., under the Act of March 3, 1879.

VOL. XII OCTOBER, 1927 NO. 5

Contents

Comment 485

The Third International Management Congress 486
By Eleanor Bushnell Cooke

Standards 491
By H. K. Hathaway

New Words for Old 505
By Muriel Jean McLauchlin

A Sense of Values in Scientific Management 511
By A. B. Rich

Address at the Final Session of the Third International Management Congress 513
By Morris Llewellyn Cooke

News of Sections 514

Reviews and Notes 514

Annual Meeting

December 7-10, 1927

Engineering Societies Building, New York

A full program of interest to general managers, production and sales managers, teachers of management, economists, psychologists and research workers has been planned.

Sessions will be devoted to general organization and administration, production management, sales management, industrial surveys, and to the bearing on the industrial relations problem of increased use of power and labor-saving equipment and methods.

Comment

AT THE First International Management Congress—Prague, 1924—there were some six hundred delegates representing seventeen nations. At the Third International Management Congress—Rome, 1927—so skilfully reported in this issue by Mrs. Cooke, there were nearly twelve hundred delegates representing forty-two nations. We may safely say that now all the world is profoundly interested in scientific management. And there is also further weighty evidence in the recent establishment at Geneva of the International Management Institute.

AT THE Prague Congress the desire was for a program primarily descriptive of American methods. At the Rome Congress delegates from other countries offered five times as many papers as were offered by Americans. That is important to the scientific management movement. European experience is not less important than our experience. There is plenty of experience to give and take in even exchange across the Atlantic. And not least; perhaps the solution of some of our fundamental problems may come from our learning to think internationally. In that we are far behind.

WE ARE pleased to be able to last to meet the many requests that Colonel Hathaway's classic paper on "Standards" be made available to the many members who have joined the Society since the paper was first printed, in 1920. In the excerpt from Mr. Rich's letter are substantial suggestions concerning scientific management and Taylor Society policy. Miss McLaughlin's study is a preliminary inquiry of a graduate student of management into the possibility of finding substitutes, for shop use, for certain words which are believed to be misunderstood or disliked by workers. Apparently substitutes for such words are not available. But it is a good thing to discuss the matter and to search for substitutes. That in itself will bring out the real meaning of words; will bring realization, for instance, that *control* as used in scientific management has that meaning given it when newspapers speak of control stations in cross-country automobile races. Eventually that is the only connotation it will have in discussions of management. We hear that Mr. Cooke's address at Rome, printed here without his knowledge, got him a hearty handshake from Il Duce.

The Third International Management Congress

Held at Rome, Italy, September 5-9, 1927. A Report

By **ELEANOR BUSHNELL COOKE**
Philadelphia, Pa.

IT IS impossible to conjure up a more beautiful or more historically interesting rostrum for any occasion than the famous Campidoglio of Rome, designed by Michelangelo to succeed the more ancient Palazzo del Senatore of 1389, and to crown the Capitoline Hill with a monument of architecture worthy of the epoch making events that had there found dramatic expression. The glorious statue of Marcus Aurelius which Pope Sixtus V and Michelangelo had moved from the Lateran, and for which the city of Rome still pays the tribute of a rose a year, continues to dominate the magnificent Piazza of the Capitol; but almost equally eloquent, according to the wise books, are the ghostly presences of those who murdered Caesar and who came not here to praise him; of Curtius who died for the people and of Tiberius Gracchus who fell in their cause; of Arnold of Brescia, who would have proclaimed the Republic here; and of Victor Emmanuel, whose monument attests to his devotion to the unity and freedom of Italy. So the Campidoglio of Rome has been the rallying place of the people and the high altar of Republicanism for hundreds of years, and its atmosphere is still charged with the spirit of unquenchable enthusiasms.

The government of Italy signally honored the Third International Management Congress by staging its opening and closing sessions on this historic spot. For both occasions the balconies of the Piazza (and I need not remind you of the Italian meaning of this word) were hung with gorgeous tapestries; flags waved gayly in the September sunshine, and the broad outside stairway leading to the Senate Chamber was lined with soldiers in bright uniforms. Within, the seats of the hall were covered with crimson; flags and banners added color to the gold of the Renaissance table and of the chairs on the stage, and masses of palms banked the corners. Portrait busts of the King, of Garibaldi, of Cavour, of Mazzini and of other Italian patriots punctuated the wall spaces.

The Senate Chamber was filled with a brilliant and cosmopolitan audience, many of whom stood against the walls throughout the session.

On the opening day, Monday, September 5, at ten o'clock, there was an imposing array of high officials to welcome the delegates in the name of His Majesty, the King, and of His Excellency, the Head of the Government.

The first address was made in Italian by the Secretary of the National Economy, who spoke on behalf of the Governor of Rome, unavoidably absent from the city. This was followed by a remarkable tour de force on the part of the charming and versatile President General of the Congress, Senator Luigo Luiggi, who extended a delightful welcome in Italian, French, Spanish, German and English, which latter language he declared to be especially sympathetic to him because of his many English speaking relatives. The third speaker was Professor Francesco Mauro, able organizer of the congress, and recent visitor to the United States, an indefatigable host in Rome, never finding anything too much or too little to do for the comfort and pleasure of the guests of the Congress. Mr. Mauro made a moving address in French explaining the necessity for the co-operation of all classes in order to secure greater production and to assure more general prosperity. He spoke of the need of standardization and of the elimination of waste, and the necessity of persuading both the employer and the worker to unite in a common effort to accomplish this end. Quoting Mr. Hoover's approval of these objectives, Mr. Mauro followed with a touching tribute to the vision of Mr. Taylor, and to the inestimable contribution he had made towards a scientific solution of industrial problems. In words fraught with sincerity and earnestness he pledged himself and his associates to unfaltering consecration to Mr. Taylor's ideas, and to a relentless campaign against the apathy of outworn traditional attitudes of mind. Finally, in most sympathetic words, Mr. Mauro announced the presence of Mrs. Taylor at the Congress, paying her an appreciative and grateful tribute on behalf of the Congress and of himself, and exciting a burst of enthusiastic applause from the audience. Then, as on several subsequent occasions, we were conscious of a deep reverence in the hearts of our European comrades for the memory of Mr. Taylor, a bond evidenced by an almost electric response running through the audience at any special mention of his name.

After President Luiggi had announced the heads of the various sections of the Congress, the meetings were declared opened, and the Congress was adjourned to meet the following day at the building of the hospitable International Institute of Agriculture, itself a fine piece of architecture located at the end of a beautiful drive through the park of the Pincio. Among the notable appointments were those of John R. Freeman, who represented the United States government at the Congress, as President of the Industrial Section and, as rapporteur, Henry S. Dennison, Past President of the Taylor Society and official representative at this Congress of the five societies[1] included in the American Committee on Participation in International Management Congresses.

Tuesday and Wednesday, September 6 and 7, were devoted to the presentation in abstract of as many of the one hundred and fifty papers as was practicable. The official bulletin reported about twelve hundred registrations including about forty-two nationalities. This list comprised professional and industrial groups as well as members of the families of the delegates who accompanied them. Many of those registered could not be present personally, but on the other hand there were many present whose names were not received in time for the record. In any case, all were to be recipients of the completed literature of the Congress, which would include every article accepted. This in itself is valuable and far-flung publicity for Scientific Management. Besides this all the Roman morning and evening papers carried three column stories covering all the activities of the Congress, generally on the front page, and we were told that similar publicity was to be given in all Italian papers. As the standard of the addresses was high and covered many phases of the four subjects, industry, government, agriculture and domestic science, the educational value of the meetings is self-evident. It is significant that speakers were requested not to use any time on arguments in favor of Scientific Management, because all present were already fully convinced of its importance.

Among the American contributors of papers who were present were Mr. Wilfred Lewis, Dr. John H. Gray, Mr. William H. Leffingwell, Mr. Henry S. Dennison, Mr. Wallace Clark, Mr. John R. Freeman, and General William Crozier by special request addressed the Congress on Scientific Management as it has been applied in government and industry.

As all papers will be available to those interested, it is necessary only to refer to the manner of their presentation. An abstract of each paper was read in the original language and immediately translated into English, French, German or Italian as required. This translation was remarkably well done by experts from Geneva. Discussion was limited to five minutes. If there was little new to learn of an old story, at least it was refreshing to hear the gospel preached by such recent recruits that their enthusiasm had all the freshness and ardor of a crusade. Here were men and women deadly in earnest on the subject of Scientific Management. The speaker who sang the old refrain about "the difficulty of applying the system to our particular business" was promptly answered by the five- minute man who claimed the floor for discussion. Avalanches of words were poured forth in eager and often heated discussion, if one could judge by the gesticulations and the inflection of the voices. Our Anglo Saxon meetings will seem very cold after the fervid, dramatic scenes enacted in the halls of the International Institute of Agriculture in the City of Rome. It may even seem desirable to import some of that dynamic vigor for the better conversion of the United States to Scientific Management!

One left the final sessions of the business meetings of the Congress with a lively sense of the tremendous vitality inherent in the subject, and a renewed consciousness of its appeal to the fundamental thinking of intelligent and truth-seeking men.

The fourth and last day was limited to ceremonies arranged for the closing of the Congress.

---

[1] American Management Association; Management Division, American Society of Mechanical Engineers; National Association of Cost Accountants; Society of Industrial Engineers, Taylor Society.

It was made memorable by the distinguished presence of His Excellency, Benito Mussolini, Head of the Government. Again, as on the opening day, the Campidoglio was splendidly decorated for the occasion, but the picturesqueness of the scene was enhanced by the participation of many more soldiers within and without the Senate, and the ceremonies were marked by even greater precision and dignity. Approach to the Capitol was closed for some distance to any but those bearing especially marked cards, and the atmosphere was charged with a tense attitude of expectancy. Representatives of the Diplomatic Corps, Government Officials, high officers of the Army and Navy and other distinguished guests filled the Senate Chamber to the number of fully two thousand. Again, as seems to be the custom of the country, only Italians occupied the platform.

Suddenly the murmur of conversation was hushed by a fanfare of trumpets on the Piazza outside. Those in charge moved quickly to their allotted positions. There were several moments of almost breathless silence, and Il Duce, Benito Mussolini, gravely and quickly entered, releasing sharp cries of welcome and a burst of applause from the audience. A forward thrust of his right arm finally secured silence and the meeting was formally opened by President Luiggi, who, in his usual happy vein, introduced the first speaker, Morris Llewellyn Cooke, President of the Taylor Society. Paul Devinat, Director of the International Management Institute, Geneva, followed with a graceful and scholarly tribute in French to Italian patriots, past and present, and was in turn succeeded by Francesco Mauro, recently re-elected President of the International Scientific Management Committee. Each speaker received a cordial hand grasp from His Excellency on completing his address.

As Mussolini rose to speak he was again greeted by vociferous applause. His vigorous and deeply serious address, given successively in English, French and German, left no one in doubt as to the value he placed on Scientific Management, nor of his sympathy with the Congress just being brought to a close; but it was when he broke into his native tongue to speak to his own people that he made the most fervid and impassioned appeal for renewed devotion to work for their country, and for a scientific attitude towards the organization of that work. He asked that we carry back to our respective homes a picture of Italy as calm and applying itself with diligence to its mighty task.

With the enthusiastic applause that greeted these words, the audience realized that the climax of the Third International Management Congress had been reached, in a setting of splendor befitting a truly historic event.

The brilliant sun shone on the departing guests as they reluctantly descended the stairway of the Palazzo between lines of gay uniforms; banners waved in the fresh September breezes, and Marcus Aurelius himself seemed to extend his hand in hail and farewell. But the final note resounding in our ears was a clarion call to earnest, devoted, consecrated work, directed and enlightened by the dictates of the uncompromising Spirit of Science.

It may seem a far cry from the active co-operation of the Taylor Society in the planning and conduct of such a Congress as that just described, and the meetings of a handful of men at Keene's Chop House, New York City, over sixteen years ago to organize, with Mr. Taylor's approval, what was called until after his death, the Society to Promote the Science of Management. For the benefit of the younger members of the Taylor Society, as well as in answer to astonishment expressed frequently abroad at the deep interest in Scientific Management in Europe, it may be well to review the Society's contribution to the international development of the subject. Now that the movement has gained such momentum as to make the location of the next Congress a matter of friendly rivalry between different countries, we may remind ourselves that the Taylor Society was the first organization of its kind to make co-operation with sympathetic spirits abroad a prime object.

In addition to lending all its facilities and its special knowledge concerning Scientific Management to the Committee on American Participation in International Management Congresses the Society has in many other ways promoted international understanding and co-operation.

One of the chief functions of the New York office has always been to serve as a kind of clearance house to which foreign members and their friends could apply for literature, information or useful introductions; and many there are who avail themselves of the opportunity to be expertly routed from individual to individual and from plant to plant in America. Last year showed an increase in such service equal to all other years put together, evidencing the increasing usefulness of this activity. In this way contacts are established and maintained which are of mutual advantage and pleasure.

Another important contribution towards international co-operation has been the collecting and forwarding of libraries to Europe by the Taylor Society, through the generosity of Mrs. Taylor and of individual members and of various industrial plants, many of whom have given valuable especially arranged data as to routine in their respective establishments. In this way Prague, Warsaw, Paris, London and Rome have been provided with complete Scientific Management libraries to date and the new International Management Institute in Geneva is scheduled for the next gift. Members of the Society have also sent to important individuals abroad copies of Copley's life of Frederick W. Taylor which have proved opening wedges to an interest in the general subject. The Taylor Society is indebted to Professor Richard Lansburgh of the Wharton School of Finance and Commerce of the University of Pennsylvania, for laborious service in the cause of the library presented to Rome. There was no formal acceptance of the gift, but it was on exhibition during the Congress and is now installed at the offices of Ente Nazionale Italiano per l'Orginizzazione Scientifica del Lavoro (E.N.I.O.S.) in Rome.

The First International Management Congress held at Prague in 1924 was the inspiration of Czechoslovakia, and marked the first organized effort for the international study of management. This was followed in 1926 by the Second International Management Congress in Brussels, and now the Third International Management Congress of Rome has joined their highly successful ranks. Our Prague brothers have every reason to be proud of the increasingly important co-operative Scientific Management movement which they inaugurated so auspiciously on the Continent. Doubtless some such happy outcome would have been realized in time, but it may not be amiss for one who is not qualified for membership in the Taylor Society to pay this tribute to the vision of those first efforts to find the proper course of international co-operation on an uncharted sea, and to the succeeding daily devotion to the nurturing and fostering of the relations established. Some of the Italians were generous enough to say that the participation of the Americans in the Congress at Rome and the high character of their papers contributed substantially to its success.

With the rapid growth of interest in the congresses, and the problems arising from increased attendance, it would seem that the time had come for a standardization of procedure for the conduct of congresses to be worked out, covering all their activities. This would simplify the problems confronting each special committee and insure a specified allotment of papers among the different countries participating. It would doubtless develop the necessity for some degree of internationalization in the personnel of the committee having the responsibility for a given congress. Adequate measures could be devised for a system of registration which would include the names, occupations, special interests and local residence of those actually attending the congress, in order that the opportunity for particular informal contacts should not be lost. Arrangements for possible restaurant service convenient to the meeting places would greatly facilitate such important contacts.

Renewed efforts would doubtless be made for more complete representation internationally and for the fuller participation of all groups. The degree of participation possible to any nation is inevitably dependent largely on the evidence that nation has given between congresses of the will and spirit of co-operation. To give unreservedly of the results of one's accumulation of experience and research to other countries seeking help is of the essence of Scientific Management. Here the old adage holds good a thousand fold—"What we hoard, we lose. What we give, we keep." Now that the employer and the worker in the United States have agreed that Scientific Management is a subject of vital mutual interest, and have witnessed to that conviction by meeting on a common platform to confer together on the subject, we may hope for a time, not too far distant, when labor in Europe will be able and willing to co-operate in international Scientific Management congresses.

No one who has not had the privilege of attending one of these congresses can begin to appreciate their value. Faith in well worn principles is revived and strengthened by the fresh light thrown on them by those who have not yet learned the fatal lesson of taking principles for granted. The opportunity is offered periodically for taking account of progress and of bringing up to date our information as to the state of the science and the art.

The opportunity of renewing old friendships vies with the pleasure of making new acquaintances. It was delightful to meet again our good friend M. de Fréminville, one of the first and most zealous advocates of Scientific Management in France, a valued friend of Mr. Taylor, and an authority on the early indications in French industry of scientific predetermination and procedure.

Also, Professor Adamiecki of Poland, whose research along similar lines was contemporaneous with that of Mr. Taylor, the tragedy being that at a time when neither had any intellectual companionship in his pioneer work, they were not in touch with each other personally.

And here is another good friend, Mr. Spacek, who seems to find the reading of an able and interesting paper before the Domestic Science Section of the Rome Congress an easy task after his indefatigable labors in directing the successful Prague Congress.

Last but not least, our own General Crozier, who hastened back from Pekin to show his unfailing loyalty to the cause. Moreover, at the earnest solicitation of Professor Adamiecki, General Crozier is planning a visit to Warsaw, where the Scientific Management torch is already burning brightly, to offer any help possible from his valuable book of experience. As this means foregoing a long planned trip to Constantinople, we have evidence not only of the persuasive eloquence of Dr. Adamiecki but also of the type of devotion of which Scientific Management adherents are capable.

A number of charming entertainments were arranged by our Italian hosts for their guests. They included an afternoon reception at the Governor's Palace, on behalf of the Governor of Rome, a luncheon at the International Institute of Architecture by its hospitable President, a dinner at the Excelsior Hotel by Signor Benni, President of E.N.I.O.S., and a tea at the Pincian Gardens by the same delightful host. There were also evening cinema entertainments, the picture of Mr. Taylor on the screen evoking prompt and spontaneous recognition.

The cockles of our hearts were also warmed by a luncheon to the American delegation given by Professor Adamiecki and the Polish delegation. There were about fifty present, Mrs. Taylor being the guest of honor. A striking Polish crayon portrait sketch of Mr. Taylor presided over the spirit of the gathering and was held in Mrs. Taylor's hand, at Professor Adamiecki's request, as she stood by him in a luncheon group photograph which he had taken as a souvenir of a delightful occasion.

In conclusion, too much cannot be said of the kindness and cordiality of our hosts in Rome. We salute them again from afar and only regret that we cannot use their own beautiful words to express our gratitude for an experience which we shall always cherish in our hearts, and I am sure that when they come to the United States there will be more than one red, white and green flag to wave with the red, white and blue in hearty welcome!

The best things in congresses, as in life, are the imponderables. Of these one becomes increasingly aware as the more objective features assume their proper values. Mr. Taylor said that Scientific Management was not so much a system as an attitude of mind.

If men and women of good will continue to meet, not to discuss mine and thine, but to search hand in hand for the common thread that will lead them out of their several labyrinths of traditional thinking about even so material a thing as livelihood, may not the whole fabric of the world's mind be changed thereby to something more capable of handling without bias all the delicate, controversial subjects that beset the round table of the nations?

One of the finest of the many indirect ways to contribute to this end is the uniting of the nations in just such friendly, intimate contact as was made possible by the Third International Management Congress at Rome.

The heightening of the individual consciousness by staging such serious deliberations amid scenes of beauty and splendor has a suggestion for us Anglo Saxons which we would do well to ponder.

Standards[1]

Successful Development and Operation of Scientific Management Call for the Establishment and Maintenance of Standards

By H. K. HATHAWAY
Schlage Lock Company, San Francisco

Introduction

THE *Century Dictionary* defines a "standard" as "that which is set up as a unit of reference; a form, type, example, instance or combination of conditions accepted as correct and perfect and hence as a basis of comparison; a criterion established by custom, public opinion or general consent; a model."

The above definition, almost but not quite, gives the significance of the word "standard" as it is used in connection with scientific management. If we change it to read: *"That which is set up as a form, type, example, or combination of conditions accepted as correct; a criterion, established as a result of scientific investigation,"* we should have a better definition of the term in the limited sense in which it is used in this paper. Inasmuch as it is the destiny of mankind to constantly advance and improve I would add, parenthetically, *"for the time being,"* or *"representing the present stage in the development of the art."*

We may classify the standards of scientific management under the following headings:

Equipment: Including machines, tools or implements, facilities for handling, transporting or storing materials.

Materials
Methods
Accomplishment
Product

Standards of accomplishment are dependent upon standards of equipment, materials, methods and product.

In 1895, Mr. Taylor said in closing the discussion of his paper on "A Piece Rate System," in which he first described elementary time study as well as his differential piece rate system of pay: "I am surprised and disappointed that elementary rate fixing (scientific analysis and time study of work) has not received more attention during the discussion. No better evidence could have been produced, however, of the crude and elementary state in which the art now stands, of determining the *time to do work* and of fixing rates, than that only one member should have most briefly referred to the matter while thirteen engineers have discussed at length the less important matter of *what kind of piece work to use."*

The blame for that, of which Taylor complained, lay largely at his own door; he committed a serious error in the selection of the title for his paper; perhaps had he called it "The Establishment of Standards as a Means to Increased Production" or "The Study of Elementary Time Units for Doing Work Under

---

[1] Paper presented before a meeting of the Taylor Society, New York, December 6, 1919, and reprinted from the *Bulletin of the Taylor Society*, Vol. V, No. 1, February 1920.

The writer wishes to disclaim any personal credit for the advantageous results cited as illustrations of standardization, in those cases where the work was done under his direction. While much credit is due to the men who conducted the investigations and worked out the problems, credit is almost equally due to the operators whose work was studied and who assisted in making the studies, as well as to the principal people in the management of the concerns in which the work was done.

It is mainly, however, to Taylor and his teachings that credit should be given, as the results were the inevitable outcome of the application of scientific methods to everyday industrial problems, and of the desire to work out in practice what Mr. Taylor stated as the first principle of scientific management—"the development by management of a science in place of rule-of-thumb or traditional knowledge and method."

In addition to those individuals mentioned in the text of the paper the writer wishes to accord due recognition to Col. W. H. Eaton, Maj. M. C. Herrmann, Mr. Charles Hoffman, Mr. Arthur Holmes, Dr. Ralph Langley, Mr. Wilfred Lewis, Mr. L. S. Tyler and Capt. D. J. Walsh, for the part they took in bringing about the results cited in this article, and to a host of others who took part in the work.

Standardized Conditions"; had he confined this paper principally to what was an epoch making advance in the art of industrial management, if not indeed the elevation of management from "rule-of-thumb" to an art, a scientific method of determining what represents a fair day's work or the time that a given job under given conditions ought to take; had he reserved the description of his novel pay system—the differential piece rate—for a later presentation, it is altogether probable that his message would have been better understood and more generally appreciated at its true worth.

This error of Taylor's, if it may be so characterized, is significant and shows that even he was not immune from the influences of the time. As is evident to anyone who studies Taylor's writing, and is well known to those who were associated with him, the Taylor System, or scientific management, had its genesis in an endeavor to establish *"standards of accomplishment—or in other words to set piece rates on a just and accurate basis."* This Taylor found necessitated an analytical study of the work to be done, which at once brought to light the fact that *there can be no standard or uniformity of accomplishment without standardization of all of the conditions under which the work is done.*

Let us take for example the boring and turning of steel tires for locomotive wheels, which I think was one of the first, if not the first, operation to be studied at Midvale. Having, as a result of experiment, arrived at and established as standard, proper combinations of feed, cutting speed and depth of cut, it soon became apparent to Taylor that unless the cutting tools used by the machinists were practically identical in quality and temper of the steel and ground to practically the same shape, clearance and lip angles, these standards could not be attained. In this we have the beginning of the long series of experiments and research described in Mr. Taylor's book "On the Art of Cutting Metals," which culminated in the invention of high-speed steel and the Taylor-White process for its treatment; the slide rules started by Mr. Taylor and Mr. Gantt and perfected by Mr. Barth, and the Taylor standard lathe and planer tools. He found that the time-honored practice of each workman grinding his own tools must be abandoned; and the development of an automatic tool grinding machine followed, insuring uniformity and eliminating the loss of production and a variable element in the time taken to do the job as a result of the time spent by the workman at the grindstone or waiting his turn to use it.

Likewise it became evident that not only tools required for cutting, but those required for setting and holding work in the machines and the tools for measuring, must be standardized and must be of the same kind and in the same good condition *as those used when making the elementary studies* upon which was based the method and time prescribed—the standard of accomplishment. It was found also that they must *also* be on hand *when wanted* in order that the workman might not lose time procuring them or be forced to make shift with less suitable or inferior tools. Result: a tool room from which standard tools were provided.

In 1893 Mr. Taylor in his paper entitled "Notes on Belting" made a contribution to the engineering profession of which Mr. Henry T. Towne said in discussing it: "The present paper is modestly entitled 'Notes on Belting,' but could be more fittingly described as a treatise on the practical use of belts. Its thirty-four pages contain more new and useful information than is to be found in any other paper that has come to my knowledge." Here we have a notable example of the establishment and maintenance of standards which determined, for a given set of conditions, the speed, the thickness and width and the tension of leather belts for the transmission of power, and further, the development of a system for their upkeep.

Why Taylor went into it he clearly states as follows: "While working as foreman of a machine shop, the tools of which were frequently driven to their maximum capacity, the writer became convinced that the belts, which were laced according to the ordinary rules, were a great source of loss to the company—*not so much from the cost of the belting and the labor of lacing as from the incidental delays to the machines* and the diminished output of the shop resulting therefrom. This was *particularly emphasized when piece work rates were established* requiring the machines to be driven hard and continuously. The belting was then shown to be by far the largest source of trouble in the shop."

It was also found in this early effort to set just piece rates that in order to reach the standard of accomplishment greater attention must be given to having the material to be worked uniform in quality, that a scheme must be provided to insure the worker always having his next job ready, and that the condition of the machines must be kept up to an established standard.

All of this Taylor covers in his paper "A Piece Rate System" by the brief statement:

> Not the least of the benefits of elementary rate fixing are the indirect results.
>
> The careful study of the capabilities of the machines, the analysis of the speeds at which they must run, before differential rates can be fixed which will insure their maximum output, almost invariably result in *first indicating* and *then correcting defects in their design*, and in the method of running and caring for them.
>
> But what is more important still, the rate-fixing department has shown the necessity of carefully systematizing all the small details in the running of the shop: such as the care of belting, the proper care for cutting tools, and the dressing, grinding and issuing same, oiling machines, issuing orders for work, obtaining accurate labor and material returns, and a host of other minor methods and processes. These details which are usually regarded as of comparatively small importance and many of which are left to the individual judgment of the foreman and workmen are shown by the rate-fixing department to be of paramount importance in obtaining the maximum output, and to require the most careful and systematic study and attention in order to insure uniformity and a fair and equal chance for each workman.
>
> While he (the writer) regards the possibilities of these methods as great, he is of the opinion that this system of management will be adopted by but few establishments in the near future, at least; since its really successful application *not only involves a thorough organization, but requires the machinery and tools* throughout the place *to be kept in such good repair that it will be possible for the workmen* each day to produce their maximum output. But few manufacturers will care to go to this trouble until they are forced to.

If Taylor failed to bring out more adequately in the first published description of elementary time study the importance and absolute necessity for standards, it is not strange that the engineers and managers of that day should have missed the point, but it is astonishing that such a lack of appreciation and understanding should exist today!

Notwithstanding all that has been said and written, relatively few people seem fully to grasp the signficance and the importance which reason and experience show should be attached to the subject. Even in shops in which the Taylor System has been applied the management comes to a complete understanding but slowly, as one by one things go wrong owing to imperfectly established standards or, more frequently, laxity or inadequate provision for their continuous maintenance.

Within the past six months I have been consulted by several managers who sought through the establishment of some sort of a pay system a cure for their industrial ills, but who shied off when I explained to them what a real remedy involved. Quite recently in a very large plant I had the pleasure of attending a meeting of the "rate setters" from every department. In this plant they had slowly progressed through the stages of setting rates for piece work, premium work and contract jobs, based upon old records, the judgment or opinion of foremen or plain guess, to those based upon some sort of analysis or study, and in a limited degree had arrived at setting rates based on elementary time study. Just where Taylor was between 1885 and 1890! It was interesting to hear these men describe the difficulties they were contending with and trying to overcome; all due to lack of standards. The same old story of trouble with belts, tools, machines, materials, inadequate planning and lack of control. If left to themselves these men would perhaps ultimately and in somewhat less time reach the same point to which the Taylor System has developed today; but what a waste of time and energy, going over the same ground that Taylor went over, when they might profit by his experience!

A successful installation of scientific management calls for the establishment of standards; its continued successful operation calls for their maintenance.

There is, of course, nothing permanent about standards; they must be modified, discarded and replaced to keep pace with progress and change; but the fact that under a system of scientific management changes may not be made without full knowledge of all that they entail is a fine safeguard against their being instigated unwisely. Taylor frequently called attention to the folly and danger of making what he picturesquely but forcefully designated as "damned improvements." In this category he placed those changes or innovations which impulsive people are wont to make without due investigation and consideration, or in some cases simply to satisfy a desire for something new, and as a result of which many businesses are kept in a constant turmoil. The installation of scientific management is, as only those of you who have gone through it can fully realize, of necessity a long and arduous undertaking, calling not only for knowledge and experience but for infinite patience and confidence. Owing to the multiplicity of factors upon which success in the undertaking depends, not the least of which is the human factor, each feature of the system as installed may be expected to break down several times before it finally works smoothly. At such times there is a strong impulse to assume that the trouble may be corrected by making changes in the plan. The engineer directing the installation must be on his guard against changes, which in themselves may be harmless so far as the feature of the system directly affected is concerned, but which may fail to fit in with other features whose development may not be taken up until some later time. Each change of this character encourages others and may result in the complete failure of the undertaking, or what is almost as bad, in a mongrel system affording little satisfaction to anyone and which sooner or later may bring discredit to the scientific management movement. In this matter to follow the path of least resistance is almost always to court trouble.

After the system has been properly installed it is not so easy to make "damned improvements" or to lightly depart from standards, yet that must be guarded against, particularly by those high in authority who unfortunately cannot be expected to have a knowledge of all the details of the system, their relationship and interdependence. The motive for making such changes usually lies in a desire to correct trouble resulting from some standard having been imperfectly established or maintained.

Most of the injustice with which ordinary piece work has been charged may be traced to lack of standards. We must be on our guard against further injustice. There are today managers who are unwilling to go to the expense or to undertake the work that is involved in the establishment and maintenance of standards essential to a true application of the principles of scientific management; they crave the benefits of increased production and delude themselves that they can get them by taking a short cut. These misguided individuals mistake the form for the substance just as did those who in 1896 discussed Taylor's piece work paper, and think that by merely making time studies—"frequently unworthy of the name"—and setting tasks they will get to the ultimate object directly. Alas, it won't work!

Several years ago a large establishment in Europe started, under the direction of an able engineer, to install the Taylor System. In one department it was well done; conditions were properly standardized and maintained; the work was routed and well controlled; proper tools and instructions were provided, and tasks were set justly on a basis of good elementary time study. Everything was going well in this department; so well in fact that the owner became impatient to see similar results in all other departments. He demanded that the workmen in another department be put on task and bonus, a certain number per day, faster than standard conditions could be established. The engineer in charge protested and left when the owner insisted. Nevertheless, the owner's orders were obeyed and a long and bitter strike resulted. In reality the men struck not against the system but for it. They said, "We can't make these rates: in the other department where you installed this system you have fixed up the machines and the belts and have men to keep them in repair; you deliver the tools—which are better than ours—to the machine in advance for each job; you have the material placed conveniently to the machine so that no time is lost between jobs. In that department the time can be made and the men earn their bonus. We have to take care of our own machines and belts, hunt up and grind our own tools and hunt up our own jobs. We demand that you do in our department what you did in the other department."

The late James M. Dodge told a story to the effect that shortly after the Taylor System had been installed in the shops of the Link-Belt Company, a friend of his—the head of a large machine works—after seeing and having explained to him the slide rules by which the proper combination of feed, speed and depth of cut are computed, persuaded Mr. Dodge to lend him one for a day or two in order that he might show it to his superintendent and foreman. A short time later Mr. Dodge heard that this friend had stated at a meeting of some kind that "he had tried the Taylor System in his shop but it had proved a failure." Upon investigation it was found that he had taken the slide rule—specially designed for a machine in which the speeds and feeds had been standardized, as had also been the cone and countershaft belts and in which were used standard cutting tools—and

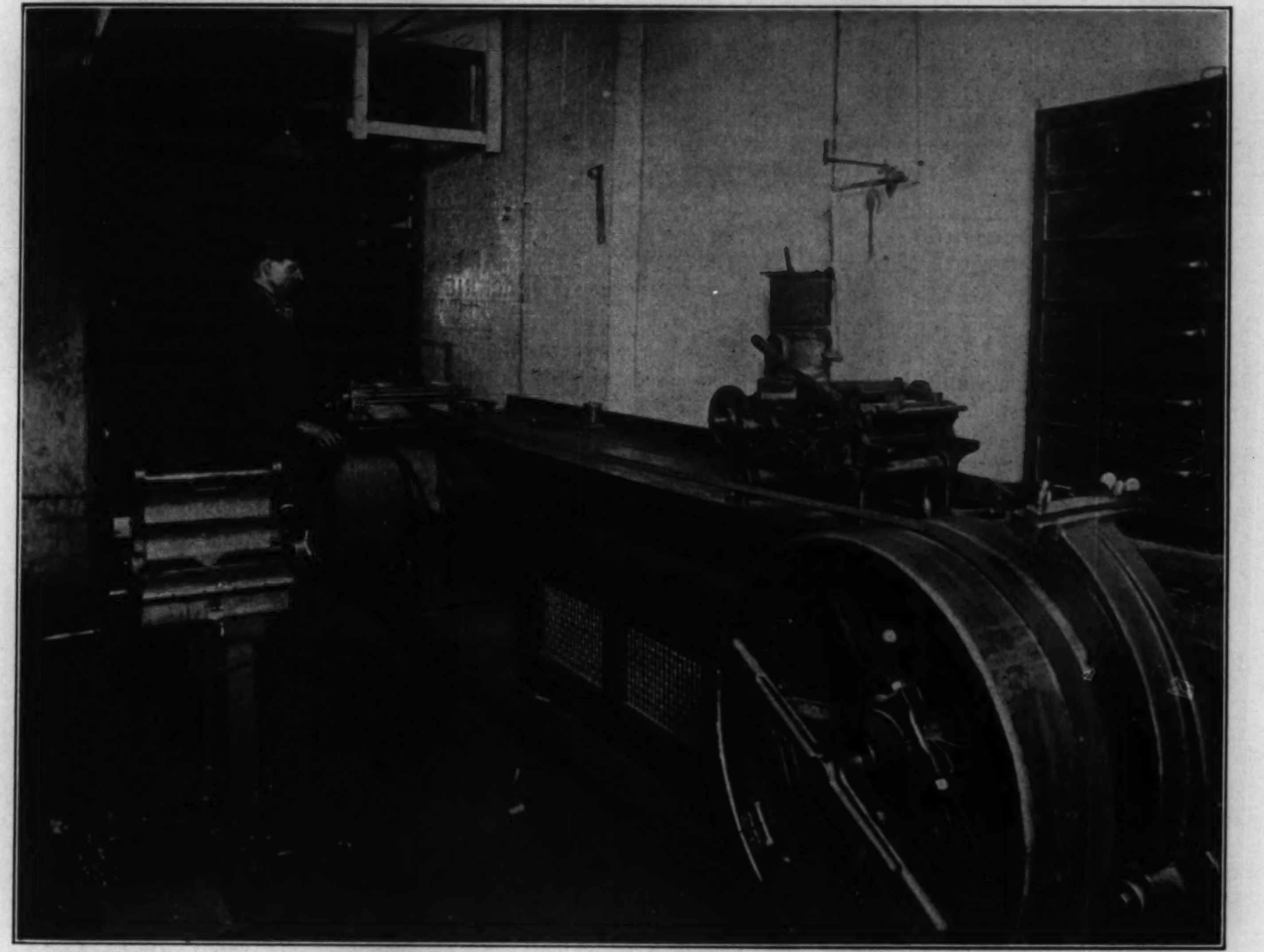


Figure 1
Barth-Gulowsen "Belt Bench." A device for periodically inspecting, repairing and tightening belts. An outgrowth of Taylor's work in standardizing belting practice.

had tried to operate according to it a machine in his shop for which none of the conditions had been standardized!

It is indeed surprising that the importance of standards in the attainment of results should be so little understood or appreciated. Only ignorance, the adherence to policies of "penny wisdom and pound foolishness," reluctance to assume responsibility, or sheer indifference on the part of the management can account for it.

In the paper, "Shop Management," Mr. Taylor made the following statements with reference to standards:

> In many cases the greatest good resulting from the application of these systems is the indirect gain which comes from the enforced standardization of all details and conditions, large and small, surrounding the work. All of the ordinary systems can be and are almost always applied without adopting and maintaining thorough shop standards. But the task idea cannot be carried out without them.
>
> The adoption and maintenance of standard tools, fixtures and appliances down to the smallest item throughout the works and office, as well as the adoption of standard methods of doing all operations which are repeated, is a matter of importance, so that under similar conditions the same appliances and methods shall be used throughout the plant. This is an absolutely necessary preliminary to success in assigning daily tasks which are fair and which can be carried out with certainty.
>
> One of the most important functions of the planning room is that of the maintenance of the entire system, and of standard methods and appliances throughout the establishment, including the planning room itself.

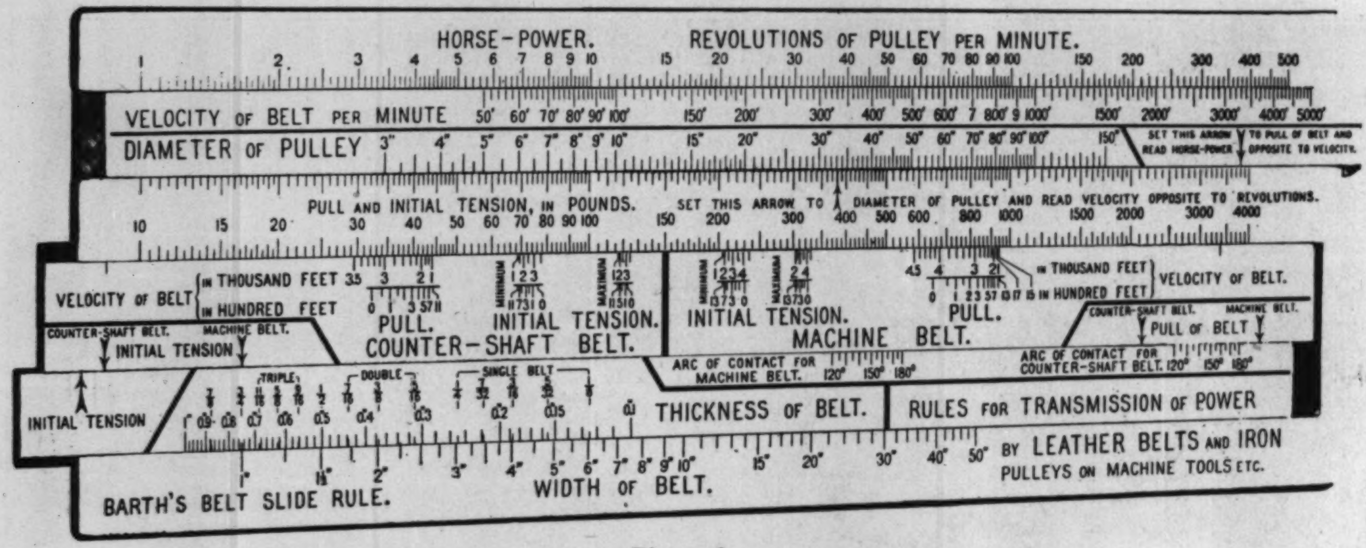

HORSE-POWER.
REVOLUTIONS OF PULLEY PER MINUTE.
VELOCITY OF BELT PER MINUTE
DIAMETER OF PULLEY
SET THIS ARROW TO PULL OF BELT AND READ HORSE-POWER OPPOSITE TO VELOCITY.
PULL AND INITIAL TENSION, IN POUNDS.
SET THIS ARROW TO DIAMETER OF PULLEY AND READ VELOCITY OPPOSITE TO REVOLUTIONS.
VELOCITY OF BELT IN THOUSAND FEET
IN HUNDRED FEET
COUNTER-SHAFT BELT. MACHINE BELT.
INITIAL TENSION
PULL.
INITIAL TENSION.
COUNTER-SHAFT BELT.
MINIMUM
MAXIMUM
INITIAL TENSION.
PULL.
MACHINE BELT.
ARC OF CONTACT FOR MACHINE BELT. 120° 150° 180°
ARC OF CONTACT FOR COUNTER-SHAFT BELT. 120° 150° 180°
PULL OF BELT
INITIAL TENSION
TRIPLE
DOUBLE
SINGLE BELT
THICKNESS OF BELT.
RULES FOR TRANSMISSION OF POWER
BY LEATHER BELTS AND IRON
PULLEYS ON MACHINE TOOLS ETC.
WIDTH OF BELT.
BARTH'S BELT SLIDE RULE.

Figure 2

Barth's Belt Slide Rule. Used for computations in establishing and maintaining standard belt conditions.

By the adoption of standards and the use of instruction cards for overhauling machinery, etc., and the use of a tickler, the writer reduced the repair force of the Midvale Steel Works to one-third its size while he was in the position of master mechanic. (There was no planning department, however, in the works at the time).

It would seem almost unnecessary to dwell upon the desirability of standardizing, not only all of the tools, appliances and implements throughout the works and office, but also the methods to be used in the multitude of small operations which are repeated day after day. There are many good managers of the old school, however, who feel that this standardization is not only unnecessary but that it is undesirable, their principal reason being that it is better to allow each workman to develop his individuality by choosing the particular implements and methods which suit him best. And there is considerable weight in this contention when the scheme of management is to allow each workman to do the work as he pleases and hold him responsible for results. Unfortunately, in ninety-nine out of a hundred such cases only the first part of this plan is carried out. The workman chooses his own methods and implements but is not held in any strict sense accountable unless the quality of the work is so poor or the quantity turned out is so small as to almost amount to a scandal. In the type of management advocated by the writer, this complete standardization of all details and methods is not only desirable but absolutely indispensable as a preliminary to specifying the time in which each operation shall be done, and then insisting that it shall be done within the time allowed.

Neglecting to take the time and trouble to thoroughly standardize all of such methods and details is one of the chief causes for setbacks and failure in introducing this system. Much better results can be attained, even if poor standards be adopted, than can be reached if some of a given class of implements are the best of their kind while others are poor. It is uniformity that is required. Better have them uniformly second class than mainly first with some second and some third class thrown in at random. In the latter case the workmen will almost always adopt the pace which conforms to the third class instead of the first or second. In fact, however, it is not a matter involving any great expense or time to select in each case standard implements which shall be nearly the best or the best of their kinds. The writer has never failed to make enormous gains in the economy of running by the adoption of standards.

It was in the course of making a series of experiments with various air hardening tool steels with a view to adopting a standard for the Bethlehem works that Mr. White, together with the writer, discovered the Taylor-White process of treating tool steel, which marks a distinct improvement in the art; and the fact that this improvement was made not by manufacturers of tool steel but in the course of the adoption of standards, shows both the necessity and fruitfulness of methodical and careful investigation in the choice of much neglected details. The economy to be gained through the adoption of uniform standards is hardly realized at all by the managers of this country. No better illustration of this fact is needed than that of the present condition of the cutting tools used throughout the machine shops of the United States. Hardly a shop can be found in which tools made from a dozen different qualities of steel are not used side by side, in many cases with little or no means of telling one make from another; and in addition, the shape of the cutting edge of the tool is in most cases left to the fancy of each individual workman. When one realizes that the cutting speed of the best treated air hardening steel is for a given depth of cut, feed and quality of metal being cut, say sixty feet per minute, while with the same shaped tool made from the best carbon tool steel and with the same conditions, the cutting speed will be only twelve feet per minute, it becomes apparent how little the necessity for rigid standards is appreciated.

Let us take another illustration. The machines of the country are still driven by belting. The motor drive, while it is coming, is still in the future. There is not one establishment in one hundred that does not leave the care and tightening of the belts to the judgment of the individual who runs the machine, although it is well known to all who have given any study to the subject that the most skilled machinist cannot properly tighten a belt without the use of belt clamps fitted with spring balances to properly register the tension. And the writer showed in a paper presented to this Society in 1893, giving the results of an experiment tried on all of the belts in a machine shop and extending through nine years, in which every detail of the care and tightening and tension of each belt was recorded, that belts properly cared for according to a standard method by a trained laborer would average twice the pulling power and only a fraction of the interruptions to manufacture of those tightened according to the usual methods. The loss now going on throughout the country from failure to adopt and maintain standards for all small details is simply enormous.

It is, however, a good sign for the future that a firm such as Messrs. Dodge & Day of Philadelphia, who are making a specialty of standardizing machine shop details, find their time fully occupied.

Does not Taylor seem to have set forth the nature and importance of standards clearly and forcefully enough in this paper to have made an impression on his audience? Again if one may judge from the character of the discussion, they did not get his message. Fourteen members discussed the paper on the occasion of its presentation. The discussion covered industrial relations with special reference to what the speakers conceived to be the principal iniquities of trades unions as of that date; political economy; the natural resources of the United States; the relative merits of various pay systems; lightly touched upon elementary time-study, planning and "system," *but not one word about standards.*

Probably ninety per cent of my hearers have read Taylor's "Shop Management." I wonder how many of them really grasped what Taylor was driving at in the paragraphs I have quoted.

So much for general explanation of what Taylor meant by standards and of their place in scientific management. I shall now endeavor to supply specific and tangible examples to illustrate each class of standards, and, as standards of accomplishment are prone to eclipse all of the others in spite of being dependent upon and in a large measure a natural consequence thereof, I shall discuss them only incidentally.

Standard Tools

In describing the results achieved through the application of scientific management in its simplest form to work of an elementary character—that of handling raw materials—such as iron ore, coal, coke, sand and ashes in the yards of the Bethlehem Steel Company, Mr. Taylor gave an illustration of the establishment of a standard that can be understood and appreciated by anyone. He found that the same size and kind of shovel was being used for all of these materials. Almost any ten-year-old child knows that coal is heavier than ashes. It is obvious (since Taylor called our attention to the fact) that a shovel that will be suitable to hold the most economical weight of one material will not be so economical when used for another material of a different weight and character. Taylor's experiments demonstrated that twenty-one pounds is the most economical weight to be handled as a shovelful, and consequently had shovels built for each of the various materials to handle that weight. Of what avail would time study or differential piece work have been in this work without the standard shovel?

A few years ago I was gratified to see the advertisement of a manufacturer of shovels who announced that he would supply a standard twenty-one pound capacity shovel for any material. I doubt, however, whether it brought him much business; to most managers such a tool is too humble to attract their attention—a shovel is a shovel.

But little above the humble shovel is the bolt, clamp and block used by the machinist in fastening work on the platen of his machine, be it planer, milling machine, boring mill, drill press or lathe. In the ordinary machine shop the management does not consider these tools worthy of its attention, each workman is *supposed* to have in some way acquired and to have on hand at his machine an assortment and supply adequate to his needs. It is taken for granted that they are in good condition; that "is up to the workman." As a matter of fact these suppositions are largely fond delusions.

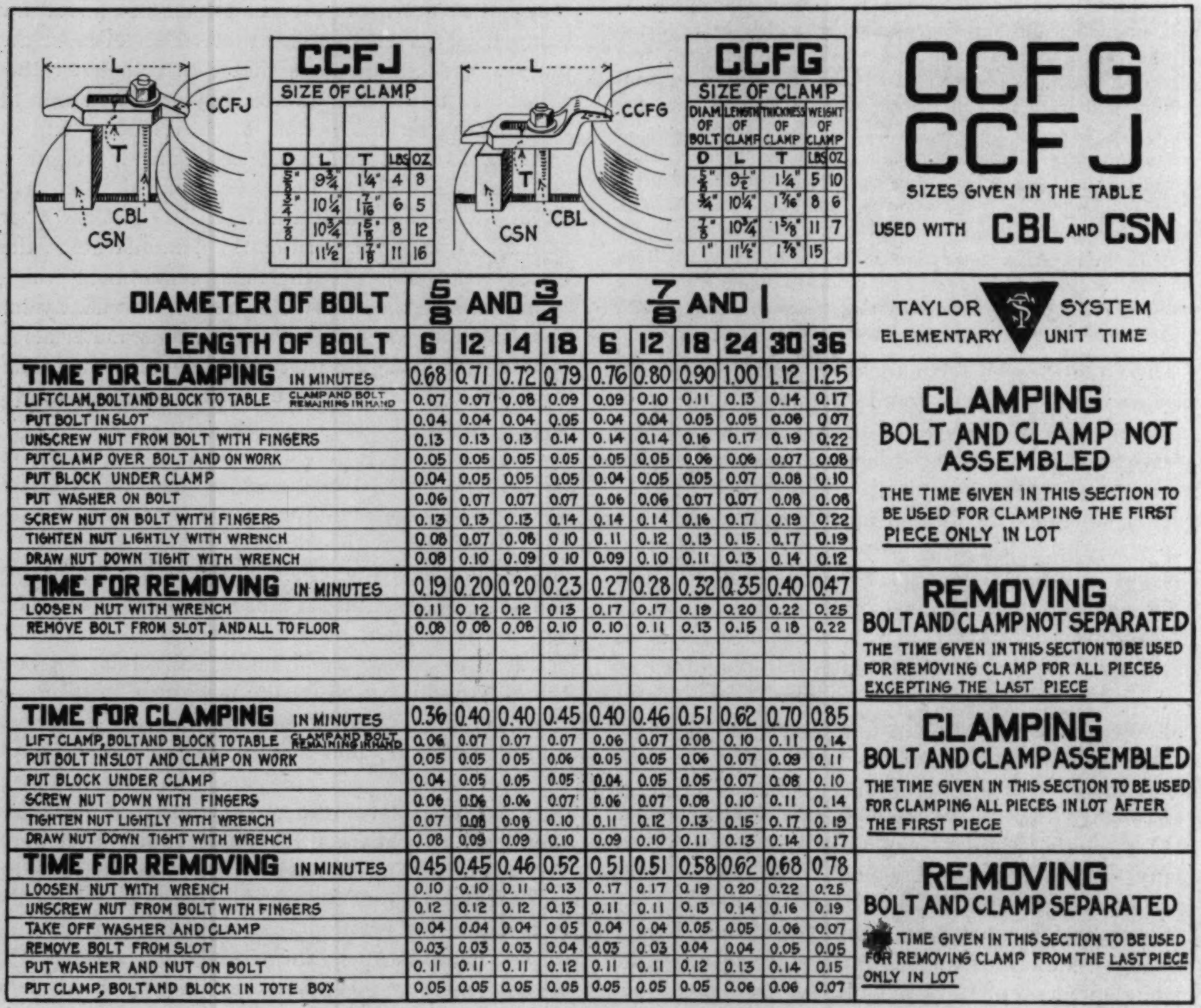
The time that it will take to clamp a job on a machine depends upon:

1. Whether the bolt, clamp and block to go under the heel of the clamp are readily at hand when wanted; whether they have to be dug out of a heterogenous mass of such tools kept by the workmen in the bed of the machine, in a box or locker; whether they have to be "borrowed" from another workman—with or without his consent; whether the workman has to go to the blacksmith shop to get a piece welded on, a bolt to make it long enough, or to the carpenter shop to get a block of the right length cut off, etc., etc.

2. Whether the head of the bolt available fits the T slot in the machine or has to be ground or filed to let it in; whether the length is just right or it is from one inch to three inches too long, necessitating either finding and putting on washers or old nuts to fill up the gap, or screwing the nut down an inch or two further than should be necessary on a bolt of the *right* length.

3. Whether the nut fits properly on the bolt so that it may be quickly and easily screwed on or off with the fingers, or whether it is so tight that it must be slowly and laboriously screwed all the way on and all the way off with a wrench.

4. Whether or not a wrench of the right type and size is readily at hand.


L
CCFJ
T
CBL
CSN
L
CCFG
T
CBL
CSN

CCFJ

SIZE OF CLAMP

D	L	T	LBS	OZ
$\frac{5}{8}$"	$9\frac{3}{4}$"	$1\frac{1}{4}$"	4	8
$\frac{3}{4}$"	$10\frac{1}{4}$"	$1\frac{7}{16}$"	6	5
$\frac{7}{8}$	$10\frac{3}{4}$	$1\frac{5}{8}$"	8	12
1	$11\frac{1}{2}$"	$1\frac{7}{8}$"	11	16

CCFG

SIZE OF CLAMP

DIAM OF BOLT	LENGTH OF CLAMP	THICKNESS OF CLAMP	WEIGHT OF CLAMP	
D	L	T	LBS	OZ
$\frac{5}{8}$"	$9\frac{1}{2}$"	$1\frac{1}{4}$"	5	10
$\frac{3}{4}$"	$10\frac{1}{4}$"	$1\frac{7}{16}$"	8	6
$\frac{7}{8}$"	$10\frac{3}{4}$"	$1\frac{5}{8}$"	11	7
1"	$11\frac{1}{2}$"	$1\frac{7}{8}$"	15	

CCFG
CCFJ
SIZES GIVEN IN THE TABLE
USED WITH **CBL** AND **CSN**

TAYLOR SYSTEM
ELEMENTARY UNIT TIME

DIAMETER OF BOLT	$\frac{5}{8}$ AND $\frac{3}{4}$				$\frac{7}{8}$ AND 1					
LENGTH OF BOLT	6	12	14	18	6	12	18	24	30	36
TIME FOR CLAMPING IN MINUTES	0.68	0.71	0.72	0.79	0.76	0.80	0.90	1.00	1.12	1.25
LIFTCLAM, BOLT AND BLOCK TO TABLE CLAMP AND BOLT REMAINING IN HAND	0.07	0.07	0.08	0.09	0.09	0.10	0.11	0.13	0.14	0.17
PUT BOLT IN SLOT	0.04	0.04	0.04	0.05	0.04	0.04	0.05	0.05	0.06	0.07
UNSCREW NUT FROM BOLT WITH FINGERS	0.13	0.13	0.13	0.14	0.14	0.14	0.16	0.17	0.19	0.22
PUT CLAMP OVER BOLT AND ON WORK	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.08
PUT BLOCK UNDER CLAMP	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.07	0.08	0.10
PUT WASHER ON BOLT	0.06	0.07	0.07	0.07	0.06	0.06	0.07	0.07	0.08	0.08
SCREW NUT ON BOLT WITH FINGERS	0.13	0.13	0.13	0.14	0.14	0.14	0.16	0.17	0.19	0.22
TIGHTEN NUT LIGHTLY WITH WRENCH	0.08	0.07	0.08	0.10	0.11	0.12	0.13	0.15	0.17	0.19
DRAW NUT DOWN TIGHT WITH WRENCH	0.08	0.10	0.09	0.10	0.09	0.10	0.11	0.13	0.14	0.12
TIME FOR REMOVING IN MINUTES	0.19	0.20	0.20	0.23	0.27	0.28	0.32	0.35	0.40	0.47
LOOSEN NUT WITH WRENCH	0.11	0.12	0.12	0.13	0.17	0.17	0.19	0.20	0.22	0.25
REMOVE BOLT FROM SLOT, AND ALL TO FLOOR	0.08	0.08	0.08	0.10	0.10	0.11	0.13	0.15	0.18	0.22
TIME FOR CLAMPING IN MINUTES	0.36	0.40	0.40	0.45	0.40	0.46	0.51	0.62	0.70	0.85
LIFT CLAMP, BOLT AND BLOCK TO TABLE CLAMP AND BOLT REMAINING IN HAND	0.06	0.07	0.07	0.07	0.06	0.07	0.08	0.10	0.11	0.14
PUT BOLT IN SLOT AND CLAMP ON WORK	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.07	0.09	0.11
PUT BLOCK UNDER CLAMP	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.07	0.08	0.10
SCREW NUT DOWN WITH FINGERS	0.06	0.06	0.06	0.07	0.06	0.07	0.08	0.10	0.11	0.14
TIGHTEN NUT LIGHTLY WITH WRENCH	0.07	0.08	0.08	0.10	0.11	0.12	0.13	0.15	0.17	0.19
DRAW NUT DOWN TIGHT WITH WRENCH	0.08	0.09	0.09	0.10	0.09	0.10	0.11	0.13	0.14	0.17
TIME FOR REMOVING IN MINUTES	0.45	0.45	0.46	0.52	0.51	0.51	0.58	0.62	0.68	0.78
LOOSEN NUT WITH WRENCH	0.10	0.10	0.11	0.13	0.17	0.17	0.19	0.20	0.22	0.25
UNSCREW NUT FROM BOLT WITH FINGERS	0.12	0.12	0.12	0.13	0.11	0.11	0.13	0.14	0.16	0.19
TAKE OFF WASHER AND CLAMP	0.04	0.04	0.04	0.05	0.04	0.04	0.05	0.05	0.06	0.07
REMOVE BOLT FROM SLOT	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.04	0.05	0.05
PUT WASHER AND NUT ON BOLT	0.11	0.11	0.11	0.12	0.11	0.11	0.12	0.13	0.14	0.15
PUT CLAMP, BOLT AND BLOCK IN TOTE BOX	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.07

CLAMPING
BOLT AND CLAMP NOT ASSEMBLED
THE TIME GIVEN IN THIS SECTION TO BE USED FOR CLAMPING THE FIRST PIECE ONLY IN LOT

REMOVING
BOLT AND CLAMP NOT SEPARATED
THE TIME GIVEN IN THIS SECTION TO BE USED FOR REMOVING CLAMP FOR ALL PIECES EXCEPTING THE LAST PIECE

CLAMPING
BOLT AND CLAMP ASSEMBLED
THE TIME GIVEN IN THIS SECTION TO BE USED FOR CLAMPING ALL PIECES IN LOT AFTER THE FIRST PIECE

REMOVING
BOLT AND CLAMP SEPARATED
[illegible] TIME GIVEN IN THIS SECTION TO BE USED FOR REMOVING CLAMP FROM THE LAST PIECE ONLY IN LOT

Figure 3
Elementary Time Study Data Sheets, showing time for putting on and taking off standard bolts, clamps and blocks.

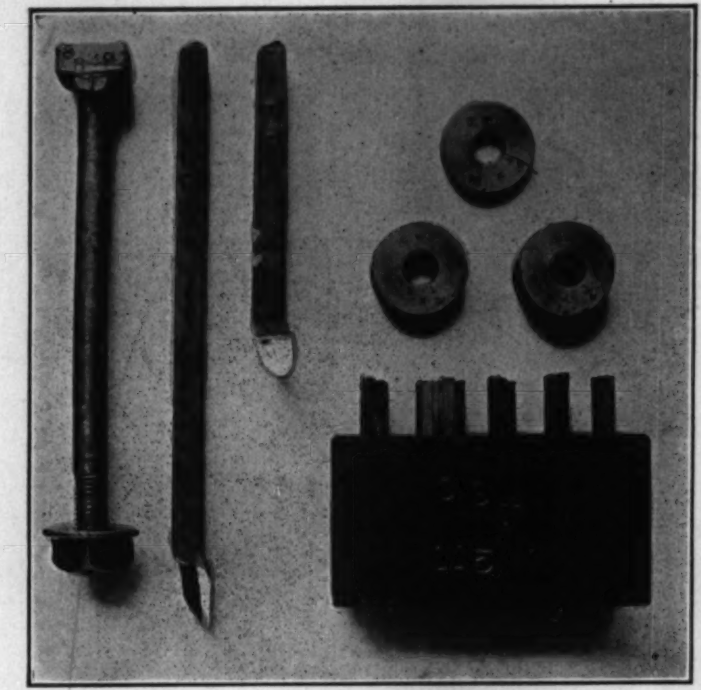


Figure 4
Standard Tools. Clamping bolt, side tool, round nose roughing tool, washers for belt, set of "shims," or packing pieces, and small wedges.

I have seen a machinist whose job was to run a large planer, the time of which was worth not less than three dollars an hour, spend fifteen minutes at a vise trying to loosen up the nut on a bolt that he wanted to use in clamping a job; the noon whistle blew while he was still struggling with it. I don't know how much more time he put in on it after lunch. The bolt was about 1" diameter and 12" long. I would call your attention to Figure 3 showing the time for putting on and taking off standard bolts, clamps, and blocks, from which you will see that for a bolt of the size mentioned the time allowed is eight-tenths of a minute.

In a machine shop run under the Taylor System standard bolts, clamps and blocks in ample assortment and ample quantity are kept in the tool room. In planning a job the number and size required to hold it is decided, the time allowed is entered on the instruction card, and they are called for on the list of tools that will be delivered to the machine in advance for the job; the bolts will be of the right length, as will be the wood blocks; the nuts will fit so that they may be screwed on or off with the fingers; and the heads of the bolts will fit the T slots of the machine. Furthermore, a wrench of the right type and size to fit the nut will be issued with the bolts so that the workman will not have to hunt for one, or to use that useful but inefficient tool, a monkey wrench.

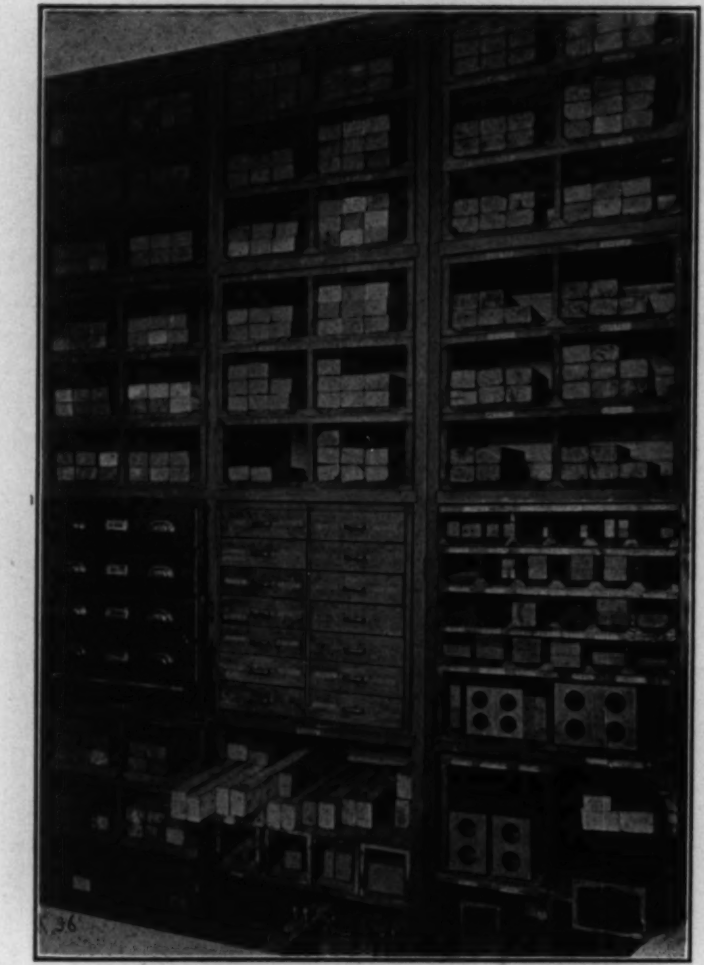


Figure 5
Section of tool room showing standard wood blocks stored in standard bins.

Of how much value would the time-study data shown be in a shop in which no standards exist?

I might cite a hundred or more similar illustrations of the advantages of and necessity for standard tools in machine shops, but I think one more will suffice.

Some years ago when studies were being made of the handling of twist drills—that is, selecting a drill of the required size from several issued for a job, verifying the size stamped on the body of the drill, putting it into a sleeve to fit the spindle of the drill press, and then into the spindle of the machine, and the reverse of these processes after drilling the hole—I was astonished and perplexed by the lack of uniformity in the time shown

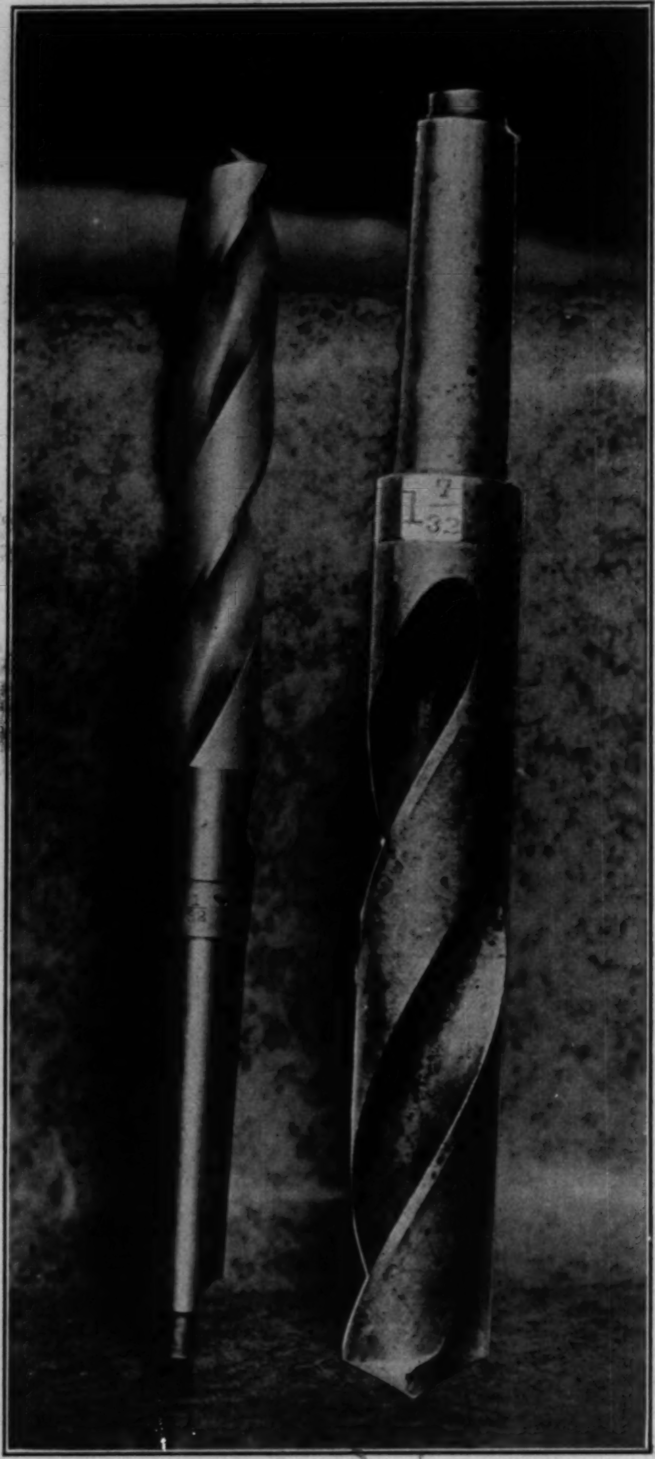


Figure 6

Twist Drills as ordinarily supplied by maker (left) and as standardized under Taylor practice (right).

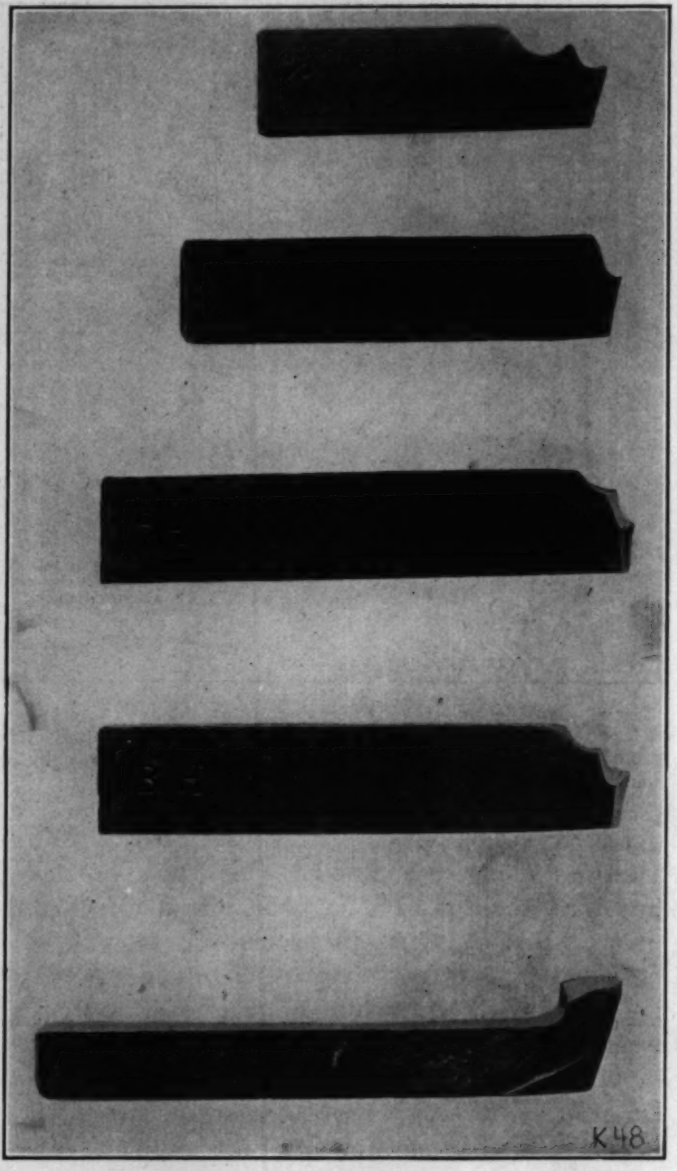


Figure 7

Lathe Tools (side view). The bottom one is Taylor standard tool-machine ground; the others unstandardized—ground by hand by workmen.

by the studies. The same set of elements showed in some observations to have taken two to three times as long as in others. Our analysis located this variation all in one element, that of selecting the drill and verifying the size. This was due, as it proved, to the fact that the makers stamped the size in small figures, difficult to read, as will be seen on the first drill in the accompanying illustration. They are also upside down with reference to the position occupied by the drill when put into the spindle, which necessitates its being turned end for end by the workman. By filing a good sized flat spot on the drill and stamping thereon the size in easily read figures as shown in the photograph we killed two birds with one stone, eliminating the variable element, cutting

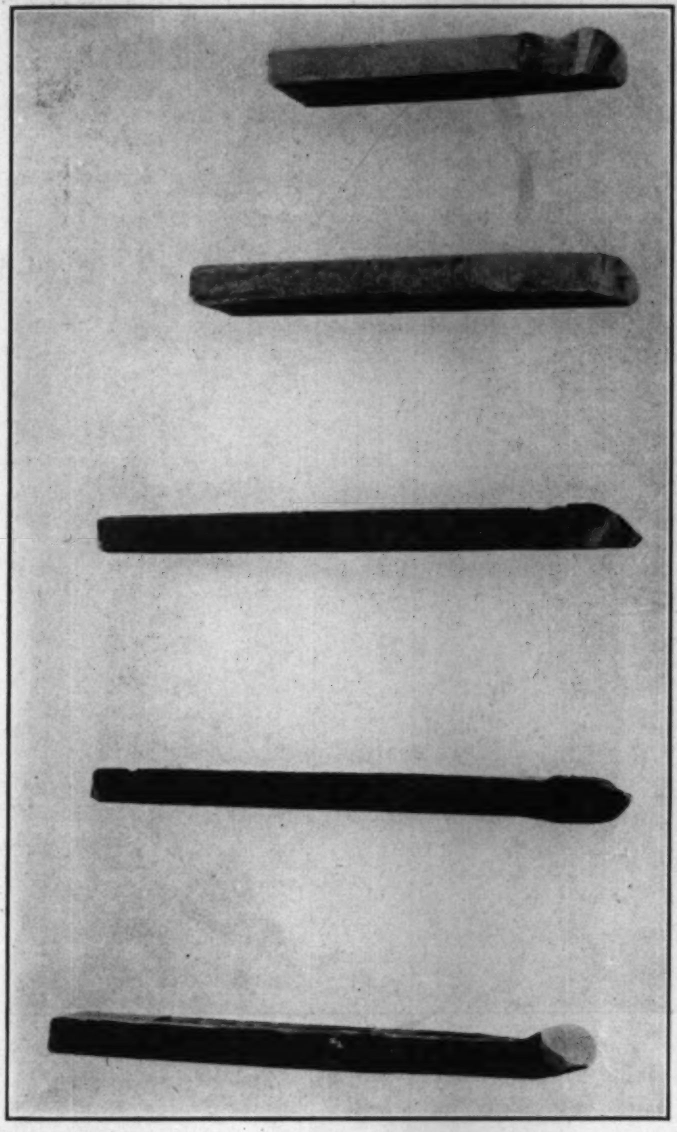


Figure 8

Lathe Tools (top view of tools shown in Figure 7).

out a superfluous element and making a proportionately large saving in time. My recollection is that the time saved exceeded the total time required after this feature had been standardized. Another standard adopted in connection with twist drills—the Barth key and keyway for driving—which has replaced in all machine shops operated under the Taylor System and even in some others, the weak and troublesome tang ordinarily furnished by the makers, does not show in the photograph.

Standardization of cutting tools by reason of its primary importance occupied the attention of Taylor, Barth, Gantt and others associated with them over a period of twenty-five or more years during which exhaustive experiment and research continued. The results of these experiments up to 1906 were described by Mr. Taylor in his presidential address before the American Society of Mechanical Engineers and attracted the attention of the foremost engineers and metallurgists of this country and Europe. Mr. Barth has been continuing this research, extending it to other classes of metal cutting such as drilling and milling. While this treatise "On the Art of Cutting Metals" primarily and directly applies to machine shop work, every manager, student of scientific management and management engineer may derive profit from reading and studying it.

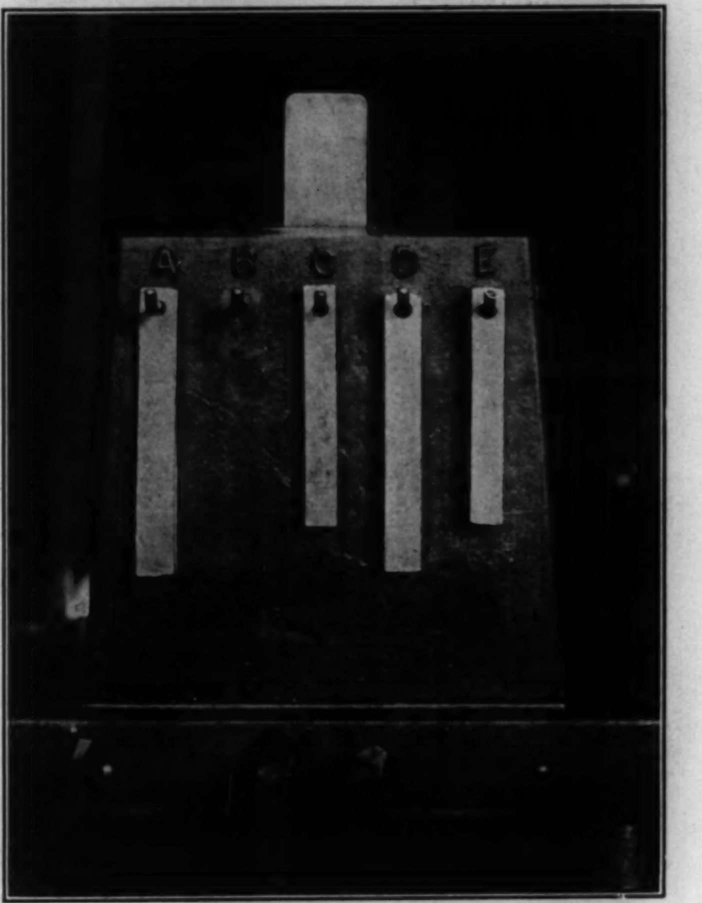


Figure 9

Height Gauge and Standard Packing Pieces, for facilitating the setting of lathe tools in tool post. (The graduations on the gauge indicating packing pieces to be used do not show clearly.)

As an apprentice I was taught by men ranking as first-class mechanics that a tool should be ground with a curved lip in order that when cutting steel the chip would be turned off in a long continuous helix, similar to the curled shaving from

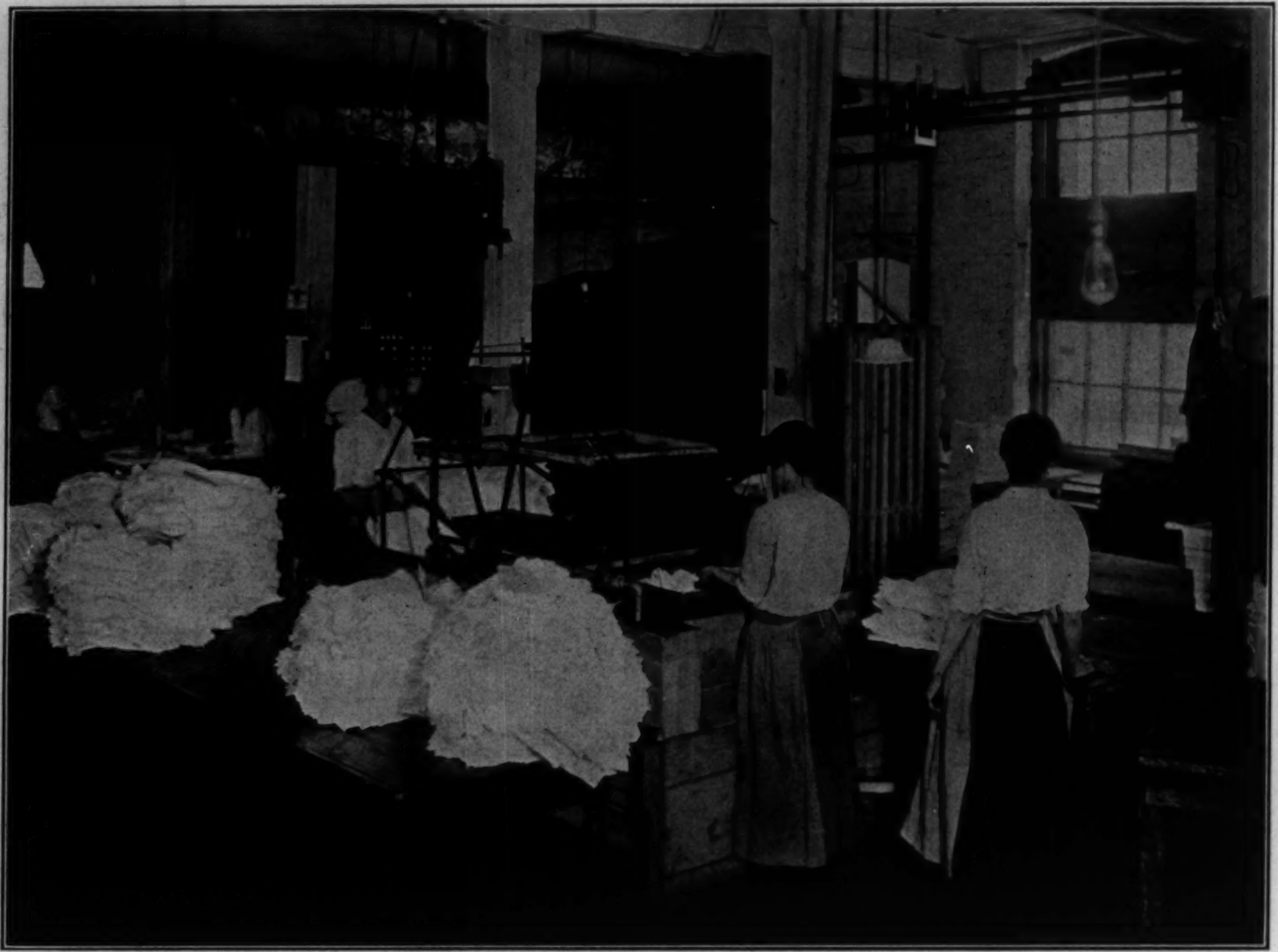


Figure 10
Special Machine for Dampening Handkerchiefs.

the carpenter's plane. This indicated that the tool was "cutting the metal off" with a knife-like action and not "pushing" or wedging it off.

Without going too far into the theory of cutting metals, it was demonstrated by the work of Taylor and his associates that (except for the fine finish cuts) the wedging action is correct in cutting steel or cast iron, the "chip" striking and sliding and breaking up on the top surface of the tool at a point some distance back of the cutting edge. At first the chips are broken off in short pieces, but little by little the chip sliding on the surface of the tool as it comes off wears it to a curve which becomes deeper and wider until it accomplishes what was effected at the start by grinding, as I was taught to do it, and finally the chip comes off in a long continuous helix. When the curve worn by the chip reaches the cutting edge we have a thin wedge section, becoming thinner and thinner until it finally crumbles or is burned away by the heat generated in cutting.

From this I think it will be apparent to you that in grinding a tool in the way the old first-class mechanics taught me to do it, I was simply artificially wearing it out and shortening its cutting life. The result was more frequent changing of tools, at uncertain intervals; more frequent grinding; more frequent dressing and waste of expensive tool steel. Standard cutting tools which under a given set of conditions may be relied upon to cut for a definite length of time are absolutely essential if a definite time is to be set for a job in which the cutting time is computed by Barth's slide rules, and the time for changing tools as well as all other items of hand

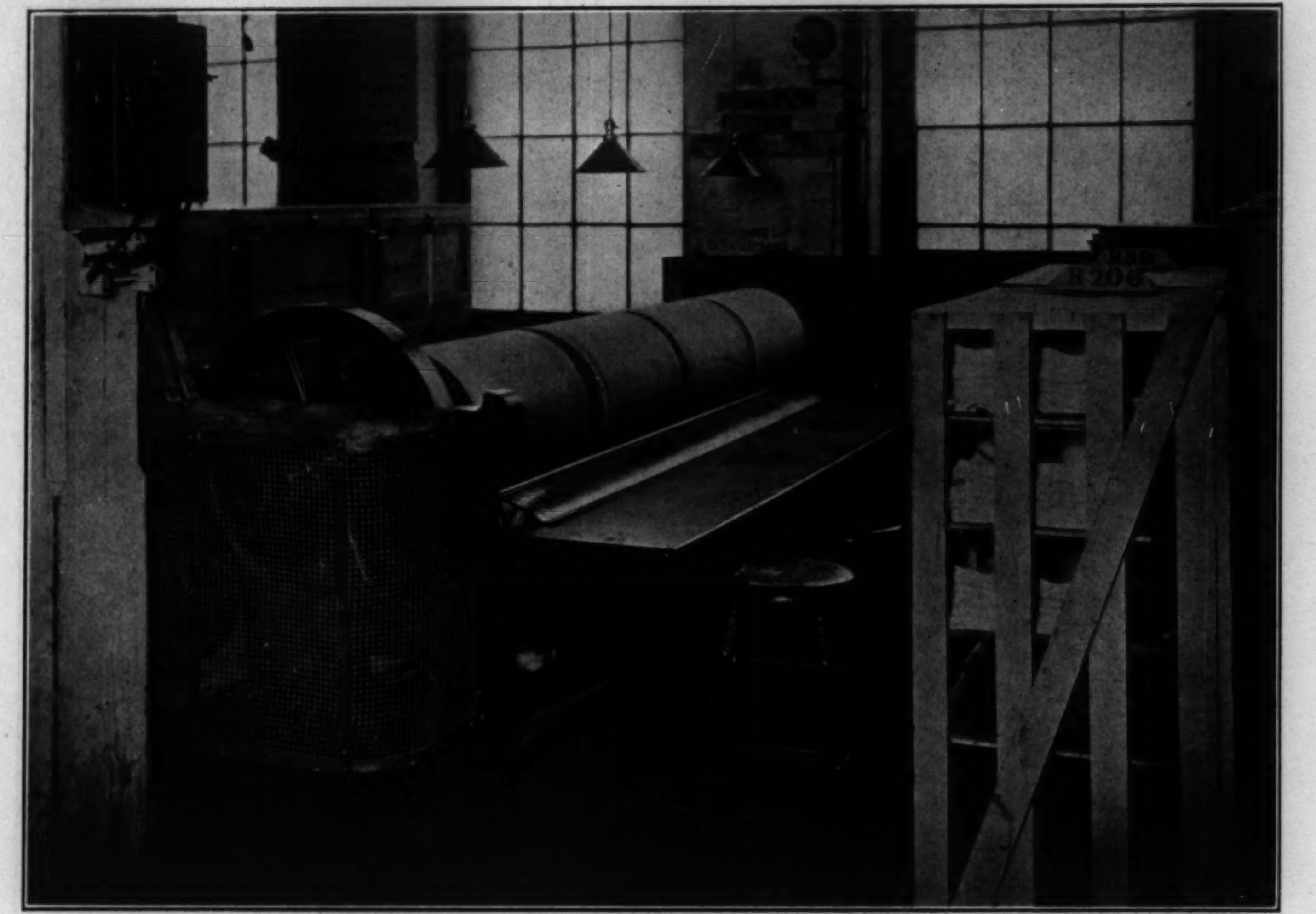


Figure 11
Standardized Ironing Machine, showing "Damp Closets" containing work to be done, which prevent its drying out; also trucks to receive ironed handkerchiefs. Note pressure gauge on steam pipe leading to machine.

work is definitely allowed on a basis of elementary time study.

Figures 7 and 8 show four lathe tools all supposedly the same—or at least used for the same purpose—which were gathered up in a shop in which each man ground his own tools. At the bottom of each photograph is shown a standard tool. It does not take a machinist to understand or appreciate this illustration.

In a plant winding small magnet coils, somewhat similar to those which you have all seen in electric bells, our time studies showed that the operator had to use during the operation, a pair of scissors, a small knife, and a soldering iron. These tools proved to be an important source of lost time and variation in output. The scissors and the knife had always been provided by the operator and there was the greatest possible variation in type, size, quality and condition. No regular provision had been made for keeping them sharp. Our studies enabled us to establish a standard of type, size and quality; from there on the company supplied them and systematically kept them in first-class condition.

While the soldering irons had been supplied by the company, no standard had been established; some of them were about six inches long over all and weighed about half a pound; and from this they ranged in size and weight up to about twelve inches long and two pounds in weight. Imagine a girl using the latter to solder together the ends of a wire 1/64 of an inch in diameter! Furthermore, it was found that the points of the soldering irons were in many cases badly in need of dress-

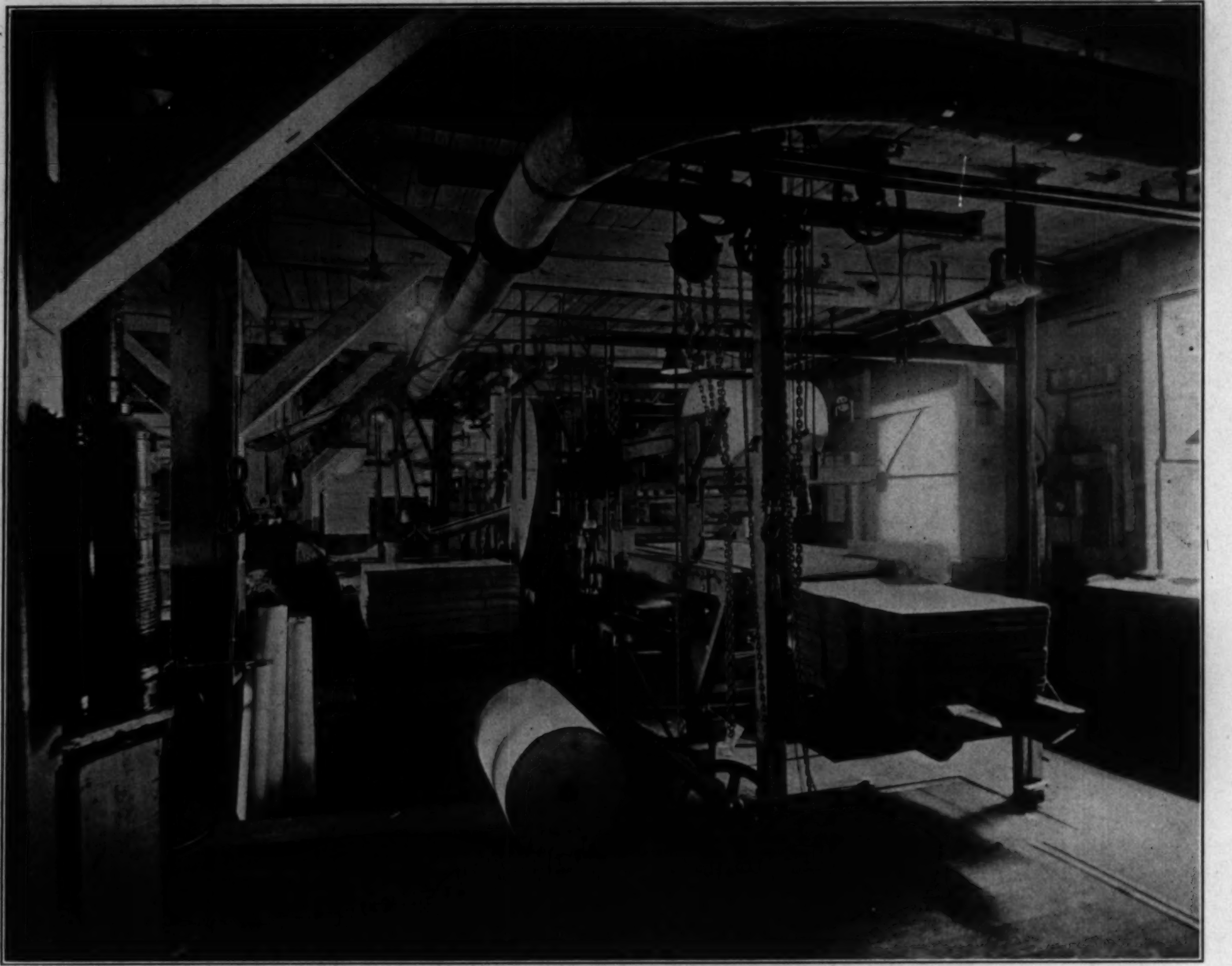


Figure 12

Machine for Lining Board. Used for making paper boxes after standardization.

ing. Here again we developed a standard of size and shape of the point, and provided for their being inspected at sufficiently frequent intervals and dressed when it was found necessary.

Another source of variability in output and of lost time and effort was due to there being provided no regular or suitable place for the operator's tools. This was overcome by providing a board, conveniently located, having a place to hold each of the tools so that when wanted the operator could put her hand on them without even looking. This was only one of the things which enabled the production to be more than doubled, with less effort and less annoyance for the operator, and incidentally enabled her to earn considerably more than she had made on piece work under the old conditions of unstandardized tools, lack of inspection, repair and proper storage.

(To be concluded)

New Words for Old[1]

An Attempt to Find Shop Usage Substitutes for Such Words as "Control," "Authority," "Science," "Scientific," "Psychology" and "Psychiatry."

By MURIEL JEAN McLAUCHLIN[2]

Problem in General — Source and Definition

THE problem considered by this paper is one that in varying degrees has come to the attention of practical executives and writers on management from time to time. It is, briefly, that of suggesting shop substitutes for words which, because of disagreeable connotation or obscure meaning, are undesirable for use in the every-day environment of industry. The purpose of language is not, as someone has said, to conceal thoughts but to express them—to lessen the distance between one individual and another. It is unfortunate that faulty and confusing terminology sometimes drives us farther apart. It is important that we have a terminology which is truly descriptive and which is standard.

This problem has been aptly stated by Mr. Portmore in a letter to Dr. H. S. Person. His paragraph on phraseology reads as follows: "A large percentage of the foremen and subforemen of industry today have had only a common grammar school education. They are always conscious of their lack of education and propose to guard it just as much as possible. To their way of thinking, words such as 'scientific management,' 'philosophy,' 'psychology' and the like belong to the men of higher education who are in a realm in which men of less education can never expect to dwell; therefore, they look wise, but have not the same understanding of these words that the management engineer has. It would therefore seem quite necessary for the engineers to think out just what phrases and words they should use in exactly the same way as they would proceed to find the best methods concerning an inanimate job that they are about to tackle. Many words by too common usage lose their original meaning. Take for example the word 'authority.' The average working person is reminded of military authority, whereas the word as applied to industry means something entirely different." Another indication that terminology presents difficulties is seen in the statement of Mr. Hugh Frayne,[3] "In any approach that you make to workmen be sure to use language that is comprehensible to them. Many of the technical terms that I have listened to this evening, such for instance as 'psychology,' do little more than create confusion in the minds of most workmen. I am sure that any essential idea may be adequately conveyed in a simple, non-technical way, and if it is connected with work in which the average workman is interested it will be quickly comprehended."

The particular words selected for discussion in the following pages are *control, authority, science, scientific, psychology* and *psychiatry*.

Method

The method used has varied somewhat with each pair of words under consideration since each presents a slightly different problem. For *control* and *authority* it has been possible to suggest new words and to test their desirability to some extent by substituting them in sentences drawn from management literature. With the other words direct substitution has not seemed feasible either because of indefiniteness or variety of meanings. Qualifying or explanatory phrases are offered for these words. It is impossible to find any one other word or phrase to take the place of *science, scientific, psychology* or *psychiatry*.

Criteria

The following criteria by which substitutes must be judged have been used, (1) they must be easily understood, (2) they must not convey an objectionable meaning, and (3) they must convey a definite and accurate idea; that is, they must be truly descriptive and adequate.

---

[1] The most important sources of material for this paper, as well as the statement of the general problem, were contributed by Mr. T. G. Portmore and Mr. A. B. Rich, both of the Dennison Manufacturing Company. Other valuable sources consisted of articles published in the *Bulletin of the Taylor Society* and books by Miss Mary P. Follett. Unfortunately, a comprehensive review of the periodical literature of labor organizations yielded no material bearing on this subject. The illustrative material has been drawn largely from articles of a theoretical nature rather than from the working environment directly. This is not so much due to choice as to necessity, and a sincere effort has been made to avoid the "academic flavor" deplored by Mr. Rich. Quotations are used in the following pages to an unusual degree because it seems more important to indicate how people directly concerned with management feel about terminology than to set forth the opinions of a student who is far removed from the field of activity.

[2] Graduate Student, Wharton School of Finance and Commerce, University of Pennsylvania.

[3] *Bulletin of the Taylor Society,* Vol. X, No. 3, June 1925. Discussion of "Scientific Management and Organized Labor Today" by Geoffrey C. Brown.

The real reason for objecting to *control* and *authority* is that they are no longer descriptive of industry as it actually exists. "When writers on business management speak of 'ultimate authority' and 'supreme control' as two of the functions of administration, I think that expressions are being used which are a survival of former days. These expressions do not seem to me to describe business as conducted nowadays in many plants."[4]

Various protests have been found in management literature against the use of *authority* and *control* indicating a new conception of industrial units as organic entities based on inherent laws rather than arbitrary creations of the mind of some individual. As illustrative we contrast the following definition of *control* with what it means in the mind of the average foreman or workman.

" 'Control' connotes observance of the law of the situation established by policies which have been adopted."[5] It is not intended, however, to imply that this is true of all businesses or even a majority of them. For those organizations still using real authority and real control there is no problem of terminology, for the words still truly describe practice. It is only important to change the forms we use when they are not descriptive of the spirit. Neither words nor situations are static. When the word ceases to fit the reality of which it is supposedly descriptive, through a change of either, then a new pairing of form and idea should be made.

The following statements illustrate the feeling that the use of *control* in industry as applied to the activity of human beings is distasteful. "The use of the word 'control' is highly undesirable—unquestionably harmless as we conceive it, it nevertheless suggests restraint and limitation, is repugnant to many people physically and psychologically and creates avoidable obstacles to the successful working of the control methods . . . "[6] Mr. A. B. Rich says: " 'Control' generally means complete analysis of the facts, constantly kept up to date; but we naturally think of our common use of the word *control*. We have no objection to inanimate things being controlled—we do not want an automobile or a locomotive to get out of control—but control of human beings ceased when Mr. Lincoln read the Emancipation Proclamation." " . . . 'control' seems to imply restraint or hindrance."[7]

Control is defined as "the exercise of restraining or directing influence over." (Webster's New International Dictionary) With that as the correct popular understanding it is no wonder that its use may arouse antagonism and resentment in industry where the master and slave relationship no longer holds. Our problem is to find another word, adequate in meaning, simple, yet not implying force or restraint for use when we are speaking of the activities of human beings. There could hardly be objection to the continued use of *control* when referring to machinery and materials.

Control has many synonyms. They can be classified into three groups according to the main idea conveyed. The first group can be called the "keep from or hold back" words, such as check, restrain, curb, hinder, repress. The second group can be named the "ascendancy over" words, as power, authority, domination, sway. The third group might be called the "management" words, which are guide, direct, lead, manage, operate, regulate and conduct. What *control* means to the average person is a mixture of the first two groups. He thinks of being corrected, hindered, or checked by someone having domination over him. The idea of subjection to power is implied. We must, therefore, look to the third group if we are to find a suitable word. These are synonyms of control in the "working with" sense. We may discard almost at once *manage, operate* and *lead.* Manage and operate both imply a handling of detail and have a fairly fixed place in industrial terminology already. A good word has been spoken for the use of operate in Burns' "Industry and Civilization": "The democratic 'operation' of industry is a better phrase than the democratic 'control,' for operation is positive and functional, but control seems to imply restraint or hindrance. This democratic operation implies that the persons at work in an industrial service shall decide or determine the methods, or some of the methods, by which the service is organized." *Lead* lacks firmness, carrying merely the idea of influencing or inducing. From those left, *conduct, direct,* and *guide,* all of which are synonyms, we may select with two factors in mind, (1) shades of meaning given in the dictionary, and (2) interchangeability with *control* in extracts from management literature. *Conduct* "stresses the idea of immediate supervision and personal leadership." *Direct* "emphasizes the notion of authority and implies the issuance of orders or instructions." *Guide* "implies more immediate personal conduct or supervision than direct." *Control* itself "implies restraint exercised upon independent activity." Of the three words, *direct* or *direction* comes nearest the meaning of control without being marred by the popular implication of restraint. It does emphasize somewhat the idea of authority which, if redefined, is really desirable. As to interchangeability, let us take the following quotations, selected at random, and read them, first using control to get the exact meaning, then substituting our candidate words one at a time in each sentence.

---

[4] *Bulletin of the Taylor Society,* Vol. XI, No. 5, December 1926. "The Illusion of Final Authority" by Mary P. Follett.

[5] *Bulletin of the Taylor Society,* Vol. XI, No. 4, October 1926. "Top Control" by John H. Williams.

[6] Ibid.

[7] *Bulletin of the Taylor Society,* Vol. XI, No. 4, October 1926. Review of C. Delisle Burns' "Industry and Civilization" by H. C. Metcalf.

"Labor control methods must be adapted to the organization. The size of the plant plus the type of organization will determine largely the kind of labor *control.*"[8]

"In the present situation between coal operators and miners . . . miners and operators are bound together; until that is fully recognized and acted upon, they will not be able to *control* their lives. Their interests are not the same, but indissolubly united . . . "[9]

"To sum up: our present idea of the state is that it is not something outside ourselves, that it must flow out from ourselves and *control* our social life. But it must *control* our life by expressing it."[10]

"This means that the emigration which has come to the United States in recent years is the emigration from countries which, through long ages, have known nothing except tyranny and autocracy, to whom the word 'law' is a mockery, whose speech is fundamentally unlike our own and who come to us with suspicion of every sort of authority or *control* that government tries to exercise."[11]

"Managers of industry, for instance, who *control* a situation and create an environment, demand that those who serve them meet the requirements which they have fixed."[12]

"The superintendent and general manager who fail to plan and *control* in the large and in detail, neutralize the value of efforts on the part of the workers . . . "[13]

Conduct is obviously a misfit, *guide* fairly good but hardly as good as *direct,* which does least to impair the exact meaning of the text. As a final test we turn to a paragraph written by Frederick W. Taylor in which *direct* and *control* are used in close association.

"If, however, either one of the parties has the entire direction, the enterprise will progress consistently and probably harmoniously, even though the wrong one of the two parties may be in control.

"The essence of task management lies in the fact that the control of the speed problem rests entirely with the management; and on the other hand, the true strength of the Towne-Halsey system rests upon the fact that under it the question of speed is settled entirely by the men without interference on the part of management. Thus in both cases, through diametrically opposite causes, there is undivided control, and this is the chief element needed for harmony.

" . . . they are allowed to drift instead of being intelligently directed and controlled."[14]

Direct is easily understood, carries a note of power without being repugnant, and gives a clear and adequate idea of what we want to say. If we wish to think of control as being inherent in the situation, not imposed from without, it may be important to clothe our new ideas in new garments to show that they really are new and different.

The case against *authority* is also based upon the organic, functional concept of industrial units. "When we are speaking and thinking of things in these terms we find that we have not in our relationships the thing that was meant by authority in the past."[15] The old conception of authority in industry, and the popular conception still, carries the idea of military power or domination. It is a rigid concept, not a releasing one. The definition (Webster's International Dictionary) is "legal or rightful power," "power exercised by a person in virtue of his office or trust; dominion; jurisdiction," "power derived from opinion, respect or esteem."

---

[8] *Bulletin of the Taylor Society,* Vol. IX, No. 6, December 1924. "Planning and Production Control." Report of Committee on Industrial Planning, Boston Chamber of Commerce.

[9] "Creative Experience" by Mary P. Follett.

[10] "The New State" by Mary P. Follett.

[11] *Bulletin of the Taylor Society,* Vol. V, No. 4, August 1920. "The Industrial Problem" by Ernest M. Hopkins.

[12] "Creative Impulse in Industry" by Helen Marot.

[13] *Bulletin of the Taylor Society,* Vol. X, No. 2, April 1925. Editorial on "Salvage."

[14] "Shop Management" by Frederick Winslow Taylor.

A glance at the list of synonyms for *authority* will show us that there is little for our purpose here. The word *authority* carries with it very definitely the idea of "power over." Any synonym with that connotation is just as objectionable as the original (ascendency, sway, power, domination) and any without it is inadequate.

We then turn to an examination of authority as it exists in concrete situations and ask ourselves if there is any constant accompaniment or any other aspect of authority which could be emphasized. *Responsibility* immediately suggests itself. "This word is not offered as an original discovery. It has all the more security because many executives have already discovered it."[16] "There is no difference except in the attitude one has, or the reaction of a person or group of persons in an organization to certain relationships in terms of authority or in terms of responsibility. These words do mean a different attitude rather than a different thing . . ."[17]

"It is axiomatic that the exercise of responsibility carries with it, by implication at least, reasonable authority with respect to determination of practical questions involved in carrying out such responsibility."[18]

There can be no authority without responsibility, for responsibility is just the other face of the same relationship. *Authority* emphasizes power over another person or situation. *Responsibility* emphasizes the condition of being answerable to the person or situation for the fulfillment of a function. Among those who conceive of an industrial unit as an organic whole working out its development according to known laws, there has often been expressed a desire for terms which imply a functional direction rather than autocratic control. *Authority* sets the attitude of the person to whom it is directed into a resistant state and that of the person who uses it toward thought of his own power to command. These attitudes are not those which make for co-operation and realization of the importance of the efforts of our co-workers. *Responsibility* tends to orient one toward those duties for which one is answerable. It fixes accountability without implying a force from without. This is what Miss Follett calls "definition of task." It is a functional concept rather than one depending upon position. By focusing on our responsibility rather than our authority we may find ourselves in a more energy-releasing, co-operative position in relation to the rest of the working unit.

With the words *science* and *scientific* we approach a slightly different problem, yet one which, in a way, embraces that faced in consideration of those already discussed. *Science* and *scientific*, especially the latter, occur most frequently in industrial situations in connection with the system known as scientific management. Due partially to unfortunate occurrences in the earlier life of scientific management a certain stigma has been attached to the system in the eyes of many workers. Besides that, the system has had to face that fear of change which all new ideas must face. Overcoming such fear is a matter of slow education involving repeated and simple explanations and illustrations. We are not afraid of the things we know. Acquaintance supplants fear by giving a chance for judgment on merit. Misunderstanding, then, based on misuse of the devices of scientific management, and upon the inertia of habit, has tended to disqualify the term in the eyes of both workers and executives. "It is possible to use the mechanism of scientific management for bad, but not scientific management itself. It ceases to be scientific management the moment it is used for bad."[19]

Furthermore, *science* and *scientific* used in the shop are likely to sound "high-brow." Another quotation from Copley's "Frederick W. Taylor" shows that Taylor felt the criticism a probable one when the name "scientific management" was first adopted. "Following the popularity given to this phrase (scientific management) at the rate hearings, Taylor himself made bold to use it formally; but it can be said that he continued to cherish a certain distaste for it, and this because he feared not merely that it had a pretentious sound, but that its connotations would seem academic to most people." This fear has proved a sound one.

---

[15] *Bulletin of the Taylor Society*, Vol. XI, No. 5, December 1926. Discussion of Mary P. Follett's "Illusion of Final Authority" by Richard A. Feiss.

[16] *Bulletin of the Taylor Society*, Vol. XI, No. 5, December 1926. "The Illusion of Final Authority" by Mary P. Follett.

[17] Ibid.

[18] *Bulletin of the Taylor Society*, Vol. XII, No. 2, April 1927. "Problems of Bank Organization" by H. A. Hopf.

[19] "Frederick W. Taylor" by Frank Barkley Copley.

Science is defined (Webster's New International) as "knowledge classified and available for use; classified and analyzed knowledge." The characteristics of science are that it is definite, precise, valid, analyzed, organized, exact, systematic, universal in application. Science describes facts and formulates relations into laws.

The following definition comes from management literature. "Science is defined as 'knowledge gained by systematic observation, experiment, and reasoning; knowledge co-ordinated, arranged, and systematized.' "[20]

The nearest synonym to *science* is knowledge (science is derived from the Latin *scio*—to know) but it does not convey the full meaning and would have to be qualified. The list of characteristics are, when taken together, more descriptive but equally hopeless as substitutes. Probably there is no single equivalent for *science* or for *scientific*, and our objections to them are not such as to bar them from use if they are fully understood. Whatever disagreeable ideas they convey are due to misunderstanding or lack of understanding rather than any concept inherent in themselves. A full understanding is likely to do a great deal to allay prejudice as we cease to think of the ideas with which we are at ease as being "high-hat." Furthermore the words fit the ideas which we want to convey and are widely accepted outside the shop as meaning just what we want to say inside the shop. The simplest and most effective thing to do then is to make the word a familiar part of the vocabulary of the shop. Such a result could be brought about by attaching to them a number of descriptive phrases, a suitable one to be selected for each particular use. A complete list of such phrases cannot be compiled away from the working environment but some suggestions can be made that may be helpful. The phrases should be numerous enough to bring out the various characteristics of science. There is no one phrase that will fit at all times. If we look at Philadelphia from the train window, our picture is different from that seen from the Delaware River, or from an airplane above City Hall. All are really the same city but no one aspect is complete without the others. We may prefer one view at one time and another at a different time but we cannot be allowed to think that any one shows us all that there is.

Phrases might be attached to our problem words such as: "science, which means classified knowledge; scientific, that is, systematic; science, or exact knowledge; scientific or classified knowledge; precise, analyzed, definite, or organized knowledge." The following quotation from an article by Robert B. Wolf is an excellent example of the clarifying and simplifying of a difficult term. "In order to bring this about, I explained that 'we must follow the scientific method instead of the rule-of-thumb method of doing things.' I also explained that there was nothing mysterious or 'high-brow' about science; that it simply meant finding out why things went wrong, so as to prevent them from going wrong again, and why they went right once in a while, so that we could make them go right more often." The real point is to make these words seem so familiar and so clear in meaning that they can ultimately stand alone.

Psychology and *psychiatry* present peculiar difficulties in that the leading authorities in these fields find it impossible to agree on definitions of them. For a lay person to attempt to discuss the fine points of definition in this case would be rather futile.

As for *psychology*, the battle royal still proceeds between the introspectionists and the behaviorists, with the dictionaries and encyclopedias still on the side of the former. Since they ignore the modern behavioristic psychology we shall in turn have to ignore their definitions in favor of those offered by new schools which have contributed most to the study of human conduct. Webster's International Dictionary gives James' definition of psychology as the "science of mental life or the study of the mind." Besides John B. Watson, the most extreme exponent of psychology as the study of human behavior, the following psychologists and men versed in psychology give definitions of a decidedly behavioristic trend. E. C. Lindeman in "Social

---

[20] *Bulletin of the Taylor Society*, Vol. VIII, No. 3, June 1923. "The Planning Department as an Instrument of Executive Control" by Keppele Hall.

Discovery" says: "Man behaves. Psychology is a method for studying and interpreting his behavior." Scott and Clothier in "Personnel Management" state that "Psychology is the study of human behavior. The value of such a study is that it assists in controlling (or shall we say *directing*?) human behavior." Arthur I. Gates, in "Psychology for Students of Education" says that the purpose of psychology is "to discover the general laws which explain the behavior of living organisms." James Drever in "Psychology of Everyday Life" say psychology "studies the facts of experience and the facts of behavior." H. S. Person, in his able article on "Industrial Psychology"[21] says "Psychology is the science of conduct or behavior though there are diverse ways of interpreting that behavior," and "the psychology of today is a behavioristic psychology." We have plenty of support, then, in thinking of psychology as the study of conduct or behavior. The popular psychologist has given the average man a confused idea of psychology as a cure-all for bad mental habits, a memory system, or a short-cut to success. A sound and simple definition would be far from such notions. Dr. Person offers "knowledge of human nature" as a good practical definition. One might also say it is a study of "how we act and why we act as we do." Mr. Portmore has suggested "common-sense reactions" as a descriptive phrase. This phrase has considerable support. Professor McDougall, in his "Outline of Psychology," says, "It is a principal feature of this book that, in this all-important matter of the explanation and understanding of human behavior or conduct, it holds 'common-sense' to be in the right . . . ." Also, the psychologist can "do little more than any intelligent man, in the face of the concrete problem of behavior." Dr. Person, in the article quoted above, says, "It is admitted that there may be fairly competent non-professional psychologists among those whose daily activities bring before them a continuous procession of human beings reacting naturally to their environment of practical affairs. 'Common-sense' which is based on intelligent accurate observation and thinking by men of wide experience with men is recognized as of scientific value . ."

In bringing an idea of the nature of psychology close to the average person the "common-sense" or "judgment" aspect must be emphasized. Sound psychological deductions are made many times by people who are not aware of the science itself. We may speak in addition, of "studying behavior, conduct, or actions." An illustration offers itself in the phrase "psychology of the word control."[22] If we say instead "the common-sense reaction to the word control," we have said something more understandable, if not as pertinent to the trained psychologist.

For *psychiatry* our dictionaries and encyclopedias again fail us. They define psychiatry as the "science that treats of disease affecting the mind." While this is an accurate definition, it is not one that would be particularly useful or acceptable for industrial use. Psychiatrists are not much more helpful. They also talk of mental disease, "pathology of the nervous system," etc. When we wish to talk of psychiatry to a relatively healthy person we would be quite mistaken to emphasize such ideas. We wish to give insight, not into seriously diseased conditions, but into the importance of all aspects of life in their relationship to happiness. What Mr. Mayo calls the "total situation" embraces the realm from which psychiatric knowledge is derived. The modern psychology, "the study of human behavior," broadly covers the field of psychiatry, but certain interpretations in this field are definitely psychiatric rather than psychological. They concern our abnormal attitudes as expressed by fears, daydreams, worries, nervousness, lack of interest in work, grouches, etc. Psychiatry takes account of physical condition, emotions, thoughts, and home and work life as important in the adjustment of the individual to his environment. It realizes the effect of influences and desires of which we are not conscious. When we have a better understanding of life as a whole and of the causes underlying our mental attitudes, psychiatry may more than at present seem "common-sense" also. For after all, unreasonable conduct must have just as adequate a cause as sensible behavior if we only knew it. The sequence of cause and effect cannot fail us in the psychiatric field any more than in the field of any other science. So, though we may describe various phenomena of behavior in the realm of psychiatry as

---

[21] *Bulletin of the Taylor Society*, Vol. IX, No. 4, August 1924.

[22] *Bulletin of the Taylor Society*, Vol. XI, No. 4, October 1926. "Top Control" by John H. Williams.

"abnormal," "unusual," or "out of the ordinary," we do not mean that they are mysterious. Our adjectives simply mean that, not being the usual ways of reaction, we must look more carefully for the underlying reasons. The anger of the foreman who is irritated by continued poor work is more obviously explained than the anger of the same man in the same shop when everything is going smoothly. In the second case we may realize, after we know that he is worried over bills at home, that the cause of irritation carried over to the shop and affected his behavior there. What is called the "psychiatric attitude" is just that willingness to look for the reasons for apparently unreasonable behavior. It is based on the concept of life as a related whole—that the man at work is just part of the whole man and cannot be isolated from the rest.

How to explain or describe psychiatry to those who are unacquainted with it is a delicate task in the shop or anywhere else. To many of us, an insane person is still a "crazy" one, not a sick one, and a stigma is attached to the term. Very few realize that there are many intermediate stages between insanity and normality and that none of us is wholly normal. All of us, even though apparently normal, have peculiarities and fears and notions that keep us from complete happiness and effectiveness. It is for those who maintain a fairly good adjustment to the demands of life that we are interested in interpreting whatever there is in psychiatry that would be helpful in understanding themselves and other people.

Explanations of psychiatry might include "a study of emotional factors," "finding reasons for unusual behavior," "studying one's relation to work, self, and others," "understanding the influence of physical condition, nervousness, fears, worries, etc., on our behavior" and "interpreting the effect of feelings and experiences on behavior." These phrases are not offered with any great confidence. It is extremely difficult to give an adequate insight into the complexity of human problems in even an infinite number of phrases. Perhaps a series of illustrative stories could be worked out with better results.

In closing the discussion of *psychology* and *psychiatry* it may be interesting to question whether the problem of understanding these words should be limited to the man who left school at an early age. During the preparation of this paper, a law student was asked the question "What is psychiatry?" His prompt and confident answer was "Studying the bumps on the head." So we may have no reason for feeling that the practical man who is confused by such terms has any greater problem than that of the college graduate who has specialized in a different field. If the practical man realizes that he *has* a problem, then it is to that extent decreased.

Putting Substitutes into Practice

It would not be well to dismiss too lightly the difficulty of changing habits of speech. A direct application of psychology as "common-sense" lies in seeing that people are most likely to continue doing things as they are used to doing them and efforts to change habits of speech or action will meet with the same resistance which any departure from custom meets. However, the suggestions set forth in this paper could be adopted without confusion by any executive or engineer who felt the need of the change. The new words, *direct* and *responsibility,* are simply different aspects of the old words. No revolutionary change of mental concept is required. The substitutes are simple and speak for themselves. The method of adding qualifying phrases is an attempt to attach to two good words, *science* and *scientific,* a number of simple meanings which will clarify and explain the words themselves. The use of phrases as substitutes for *psychology* and *psychiatry* ought to be easier than introducing the originals because the originals are practically unknown in the shops and definitions are still vague.

A Sense of Values in Scientific Management[1]

By A. B. RICH
Dennison Manufacturing Company, Framingham, Mass.

SCIENTIFIC Management is no substitute for ingenuity, resourcefulness, intuition and various other tools which are necessary for economic health. If I cannot give any constructive thought to the need, I would be glad if I could uphold your hands to some extent in censorship of some of the half-baked ideas, theories, and proposals of the unbalanced enthusiast. For if there is any one enemy to this Society it is that type of person. Business health, like physical health, must be all-around health, and not partial. Enormous biceps and flat feet, great lung capacity and defective teeth, etc., do not constitute a man who can be depended upon in a race, and it is unfortunately the fact that many of our most striking examples of Scientific Management are comparable with such a figure.

---

[1] Excerpts from a letter to the Managing Director of the Taylor Society.

I would like to quote you a sentence or two from William James, that seem to be suggestive:

"The ideal of every science is that of a closed and completed system of truth. The charm of most sciences to their more passive disciples consists in their appearing, in fact, to wear just this ideal form. Each one of our various 'ologies' seems to offer a definite head of classification for every possible phenomenon of the sort which it professes to cover; and so far from free is most men's fancy, that, when a consistent and organized scheme of this sort has once been comprehended and assimilated, a different scheme is unimaginable. No alternative, whether to whole or parts, can any longer be conceived as possible. Phenomena unclassifiable within the system are therefore paradoxical absurdities, and must be held untrue. When moreover, as so often happens, the reports of them are vague and indirect; when they come as mere marvels and oddities rather than as things of serious moment, one neglects or denies them with the best of scientific consciences. Only the born geniuses let themselves be worried and fascinated by these outstanding exceptions, and get no peace till they are brought within the fold. Your Galileos, Galvanis, Fresnels, Purkinjes, and Darwins are always getting confounded and troubled by insignificant things. Anyone will renovate his science who will steadily look after the irregular phenomena. And when the science is renewed, its new formulas have often more of the voice of the exceptions in them than of what were supposed to be ~~the~~ rules . . . . .

"To no one type of mind is it given to discern the totality of truth. Something escapes the best of us—not accidentally, but systematically, because we have a twist."

If I have any ideal in my own mind of what Scientific Management should be, it is that it should be more nearly comparable with the science of medicine than with any other I can think of. This science utilizes a great variety of knowledge. It depends upon physiology or biology for its knowledge of health and disease, and it is even acknowledged lately that psychology was of the utmost value to the old country doctor, and in some rare cases it is coming into its own again as a tool of great value. So with Scientific Management we use various sciences for the knowledge of human nature, mechanics, economics, chemistry, metallurgy, etc., but in the utilization of these various sciences for a definite purpose—and it is a purpose which constantly measures and weighs the results attained or to be attained—I am convinced that in a multitude of cases we lose sight of the purpose; we forget to weigh and measure our progress in the light of our purpose; we fail to develop a balanced organization. Perhaps our production is managed in the most approved manner, but if we have no merchandising policies worthy of the name, or a selling organization incompetent to distribute our product, we are not a help to the theory of Scientific Management, but a hindrance. We need to put some emphasis on this idea of the comparison that exists between management and medicine, and the importance of a sense of values as the prime requisite for the managers. Perhaps the proper description of what I have in my mind is that we need a philosophy.

I have heard a great deal about the ideals of American industry; that the greatest amount of production was obtained from the man happy in his work, contented, loyal, high-paid, well-trained, not ruled by fear, but by his own understanding of the purposes in which he assisted, but I don't think we should forget that this ideal individual is somewhat like the economic man—he doesn't exist, and he never has existed. As the farmer said, "There ain't no such animal," and it is not going too far to say that hardly any organization engaged in the art of management is making any serious attempt to develop any such individual. It is something like Christianity. We are none of us Christians, and I am not certain whether we ever could be or would be for any length of time, and yet we feel that it is an ideal which is proper to hold up to humanity. Only we have not as yet put sufficient emphasis on our Scientific Management ideals. We have talked a great deal about the mathematics (if I may so refer to the measurements of labor, of materials, etc.,) but we have failed to define clearly what the final human result should be of our management activities. These two things seem to merge out of this welter of conversation I am sending you—the importance of balance, of a sense of values, of all-round development instead of partial or one-sided development; and the necessity of having some ideal of management in regard to the development of human beings—the influence which it wishes to exert upon human beings—the kind of humans or "robots" it wishes to see the world composed of. These two things are deserving of some thought or attention from the Society and its friends.

Address of Morris Llewellyn Cooke

President of the Taylor Society

At the Final Session of the Third International Management Congress

THE closing session of the Rome Congress was especially impressive and colorful. On the platform sat Mussolini and the other speakers, Government ministers and leaders of Italian industry. On the floor was an audience of some 2,000—army and navy officers, the diplomatic corps, delegates and others. Brief addresses were delivered by Senator Dr. Luigi Luiggi, in Italian; Francesco Mauro, President of the International Committee on Scientific Management Congresses, in French; Dr. Paul Devinat, Director of the International Management Institute, in French; Morris Llewellyn Cooke, President of the Taylor Society, in English, and the principal address was by Mussolini, Capo del Guverno, who used in turn French, German, English and Italian. All of these addresses will be available eventually in the official proceedings; in the meantime we give our members the address by Mr. Cooke.

Your Excellency—Ladies and Gentlemen:

As the president of the Society founded to perpetuate the work of Frederick W. Taylor—and to extend it—there falls to my lot the happy privilege of thanking you for the great service to the cause of Scientific Management rendered by the broadly conceived and ably executed Third International Management Congress now coming to this most auspicious conclusion. Coupled with this expression of our sense of the complete success and great importance of this gathering of course there goes our thanks for your touching hospitality. And I have in mind both the bountiful planning of those high in the administration of the Congress as well as the uniform thoughtfulness and patience of assistants in caring for our smaller needs. And surely it is appropriate for me to acknowledge at this time the whole-hearted support this Congress has evidently had from your Excellency and the Government. I know I need ask no permission from those hailing from countries other than my own in impressing on you our appreciation of all these factors—an appreciation as deep as it will be abiding.

And now, speaking as an American and for our American delegation, I would not have told you of a matter which lies nearest my heart did I not express to this Congress the satisfaction and elation we feel in the high place in this movement which in your generosity you accord to our great countryman Taylor. He lives even though he did give his life for our cause.

Of course we in America view with the keenest satisfaction the widening interest throughout the world in organization *as such*—especially in the organization of work. As we have vastly more to learn than we have to give we value opportunities for the widening of acquaintance and for the free exchange of ideas through papers and otherwise as have been afforded by this Congress.

The idea of a science of management and administration is not a new one. But the realization on this idea in any comprehensive national sense with us is quite a new development. But during the last few years we have begun to score up large national dividends as shown especially in the paper presented by Mr. Wilfred Lewis. In fact the yield is one which appears to progress geometrically. This but bears out a favorite theory of Taylor to the effect that the largest gains from Scientific Management might be expected in those areas already well managed.

This international movement for the promotion of Scientific Management grew out of a desire to afford the technical men of the old world and of the new not only a common objective—a common social purpose—but to provide them with a common technique for its accomplishment. Alligned with this enterprise in my own country are such agencies as: the American Society of Mechanical Engineers, the Society of Industrial Engineers, the National Association of Cost Accountants, the Taylor Society and the American Management Association with a combined membership of tens of thousands of technically trained men. You know better than I the strength of the co-operating agencies on this side of the Atlantic. Before such an alliance even the intricate problems of industry must eventually find their solution.

You have been hosts to hundreds of men and women from many lands each eager to broaden his or her knowledge as to the theories and practices and devices which make for more effective action in the workshop, in the home, in the field and wherever else work is to be performed. But the large attendance at the sessions of the Congress of your own people, the high character of the contributions which you have made to our discussions make it clear that this movement is one which has seriously gripped the imagination of the Italian people.

We are here and now glad to strike hands with you in the execution of a far-reaching enterprise. To quote the happy expression of our international president, just re-elected for another two years—your own countryman Engineer Mauro—we are "soldiers for an idea." We seek to make human work effective—progressively effective—and thereby constantly to raise the standard of living in order that the human spirit may be freed for wholly new adventures.

News of the Sections

Japanese Branch

The Japanese Branch in Tokyo reports a series of bimonthly meetings, during the past year, that were outstanding both in the subjects handled and in the number of people who participated. The actual membership of the group is under thirty, but the topics under discussion were of sufficient interest to bring out many others interested in management.

On November 22, Mr. K. Misima, Director of the Calpis Manufacturing Company, and Mr. M. Sotooka, General and Marketing Manager of the Hamaguti Company, talked to an audience of sixty people on "Our Recent Labor Disputes." On February 22, two Taylor Society members, Mr. M. Yagyu of the Okura Civil Engineering Company and Mr. H. Miwa, Captain, the Hiro Naval Arsenal, spoke. Mr. Yagyu talked on "The History of the Application of Taylor Principles to the Construction Industry" and described the management end of construction work on the late Emperor's funeral palace. Mr. Miwa spoke on "Japanese Industrial Development and Efficiency." Thirty attended. On April 13, eighty management men of Tokyo and Osaka met to hear twenty Taylor Society members tell "How to Install Scientific Management." At the closing meeting on June 10, Mr. Y. Ueno, Director of the Institute of Industrial Efficiency, spoke on "The Closer Relation Between Management and Accounting." Seventy attended and the following took part in discussion: T. Araki, Consulting Engineer; J. Izeka, Professor, Meiji University; R. Kaneko, Hurakawa Mining Co., Ltd.; S. Nisio, Teikoku Life Insurance Co., Ltd.; K. Matuno, Professor, Keio University; K. Kiributi, Professor, Tokyo Technical College; M. Tukasaki, Toho Electric Co., Ltd.

New York Southern Tier
Central New York

Dr. Person was the speaker for the opening meetings of the New York Southern Tier and the Central New York Sections of the Society, speaking at Elmira, September 12 and at Syracuse, September 30, on "The Present Status of Scientific Management at Home and Abroad."

Reviews and Notes

Introduction to the Study of Public Administration. By Leonard D. White, The Macmillan Company, New York, 1926, pages xiii, 495.

Professor White has made a gallant and worth-while pioneer effort to write a one-volume book for "the college and university student of political science and the citizen who wishes to understand the basis of the executive phase of public affairs" (preface), covering the whole complicated, many faceted and technical subject of administration in the modern state.

The title is slightly misleading, for the discussion is wholly of the United States, there being virtually no reference, except an occasional bibliographic one, to the experience of Europe, and only a few paragraphs of comparison with Great Britain.

The author's first and cardinal assumption, which is original with him so far as book writing is concerned, is that administration is a single process, substantially uniform in its essential characteristics wherever observed; and therefore the book avoids the study of federal, state or municipal administration as such. On the contrary, the scheme is to make a comprehensive, though condensed, functional study of the whole range of administrative problems, "starting from the base of management rather than the foundation of law."

Accordingly, we find centralization, integration, department organization, rule making, relations of administrators to legislatures and to courts, and so on, treated with much well chosen, though sometimes poorly arranged, illustrative material, and much extremely valuable documentation.

While the assumption is pretty sweeping, it states a point of view which is generally sound, has been neglected, and needs emphasis. One need not quarrel with it to feel that it has involved the author in serious difficulties of style, and in the choice and comparison of his material. For example, the problem of "integration" in administration is dealt with in sixty pages and in this compass the attempt is made not only to describe, but to characterize and criticize the tremendous changes which have occurred in this field in nation, state and city, during the last quarter century. It is inevitable that the result should be confused and inadequate, and, one fears, not very helpful to the audience which is addressed.

The value of the assumption, however, when given a fair chance, is seen in the treatment of the personnel problem. When the author reaches this topic, which he evidently regards as the heart of the whole matter, he lets himself go, and writes as if he really enjoyed it, devoting nearly two hundred pages to various aspects of this question. While this produces a lack of balance in the volume, as another reviewer has pointed out, the substance of these chapters gives us easily the best general survey of this topic yet made; and selections from them should find wide use in university courses. The chapter on "Morale" deserves special mention. This part of the work, plus the idea of unified attack, plus the "leads" which are opened up all through to other students of the subject, make the book a real contribution to American political science.

JAMES P. RICHARDSON[1]

Management in the Factory. By Glenn Lion Gardiner, M. A., McGraw-Hill Book Co., Inc., New York, 1925, pp. xii, 225.

This little book, which was written primarily as a text book for the University Extension Division of The University of Wisconsin, is an elementary treatise on factory management, written so as to be readable and readily understood by factory foremen, minor executives, students, or any person desiring a bird's-eye view of the functions of management.

There is at this writing a very noticeable increase in general interest in various forms of foreman training and development work. This book with its companion volume, "Practical Foremanship," by the same author, will be found to constitute very satisfactory textual background for this sort of educational work. The author, through long contact with workmen and foremen and their problems at the Chevrolet Motor Co., the Oakland Motor Co., and other plants, has achieved a concise, straightforward, plain spoken style which is bound to appeal to the average shop man, who as a rule is not a rapid reader.

Each chapter is followed by a few questions tending to emphasize and fix in the reader's or student's mind the salient points covered.

If more of our foremen and ambitious young men in industry would read and absorb books like this one, much "muddy" thinking would be eliminated and the problems of management would be simplified.

E. F. PAPWORTH[2]

Foremanship. By Glenn L. Gardner, The A. W. Shaw Company, Chicago, 1927, pages xv, 680.

The novice in the field of industrial engineering is apt to think the development of better methods, systematic routines and the planning of work mean that less capable men are needed in supervisory positions. It is perhaps an irony that the more you take away from the foreman the things he used to do, the harder his job becomes, and the better trained men are required to fill it. This is quite the contrary to the often expressed fear that there will be nothing left for the foreman to do.

During the last ten years, considerable thought has been given to the problem of training foremen. Foremen should not feel they are to this extent being "picked on." Superintendents and managers probably stand just as much in need of training as do foremen. It should on the contrary be a source of satisfaction to foremen to realize their unique position in industry is recognized and appreciated. Courses for foreman training have ranged from the sublime to the ridiculous. Some are planned to give a foreman a general knowledge of the origin and growth of the factory system and the ramifications of present day industrial organization. Some even attempt to expound the fearsome and wonderful business cycle. All of which do no harm perhaps and may do some good. Only a few, however, deal with the concrete phases of a foreman's own job and how he can do it better.

This 680 page book of Mr. Gardiner's largely falls in this last class, as distinguished from his two previous works on the same subject. It may be unfair to conclude that it marks the evolution of his own ideas on the subject. It is in fact a formidable work, containing much worth-while data. No foreman could read it without being benefited. Its very size and arrangement, however, are sufficient to discourage the average foreman from undertaking the task.

If Mr. Gardiner had any clear cut plan in preparing the book, it is hard to picture what it was. His preface says it was "prepared for the use of foremen in industry and all of those interested in foremanship . . . . ." Quantity, however, in the case of material for foreman training is not as desirable as quality. One simply uses up paper and patience in assuring a foreman, in such a work, that "storerooms should be properly lighted." Almost 100 pages are given over to the technique of foreman training, none of which is new. It would be of little interest to a foreman. Apparently Mr. Gardiner is "flirting" with the conference method of training foremen. There seems no reason, however, for terming them "foremanship discussionals" when the word "conference" is and has been in use some years. Certainly no one with much experience with the conference method would advocate one hour sessions.

The subject of foreman training deserves the attention of engineers and managers and nothing is better calculated to pave the way for management development work than these training conferences. Mr. Gardiner's book fails, however, in my opinion, either as a text for the use of individual foremen or as a text for conference leaders, due to his attempt to cover too much territory.

A. L. KRESS[3]

---

[1] Professor of Political Science, Darmouth College.

[2] Assistant Comptroller, Brown-Lipe-Chapin Division, General Motors Corporation, Syracuse, N. Y.

[3] Industrial Engineer, United States Rubber Company, New Haven, Conn.